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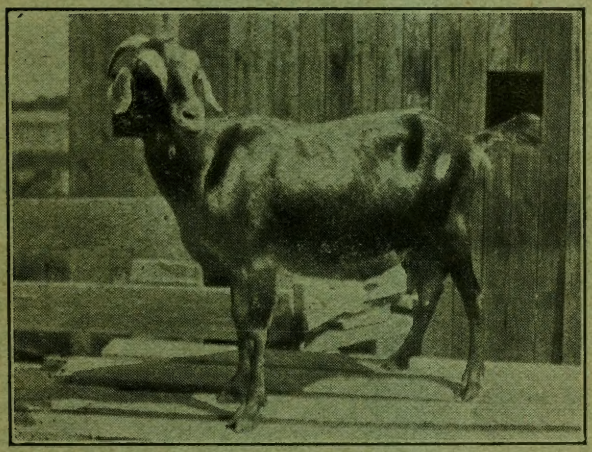
The Milk Goat Dairy

THIRD EDITION



By G. H. WICKERSHAM
WICHITA, KANSAS

PRICE FIFTY CENTS

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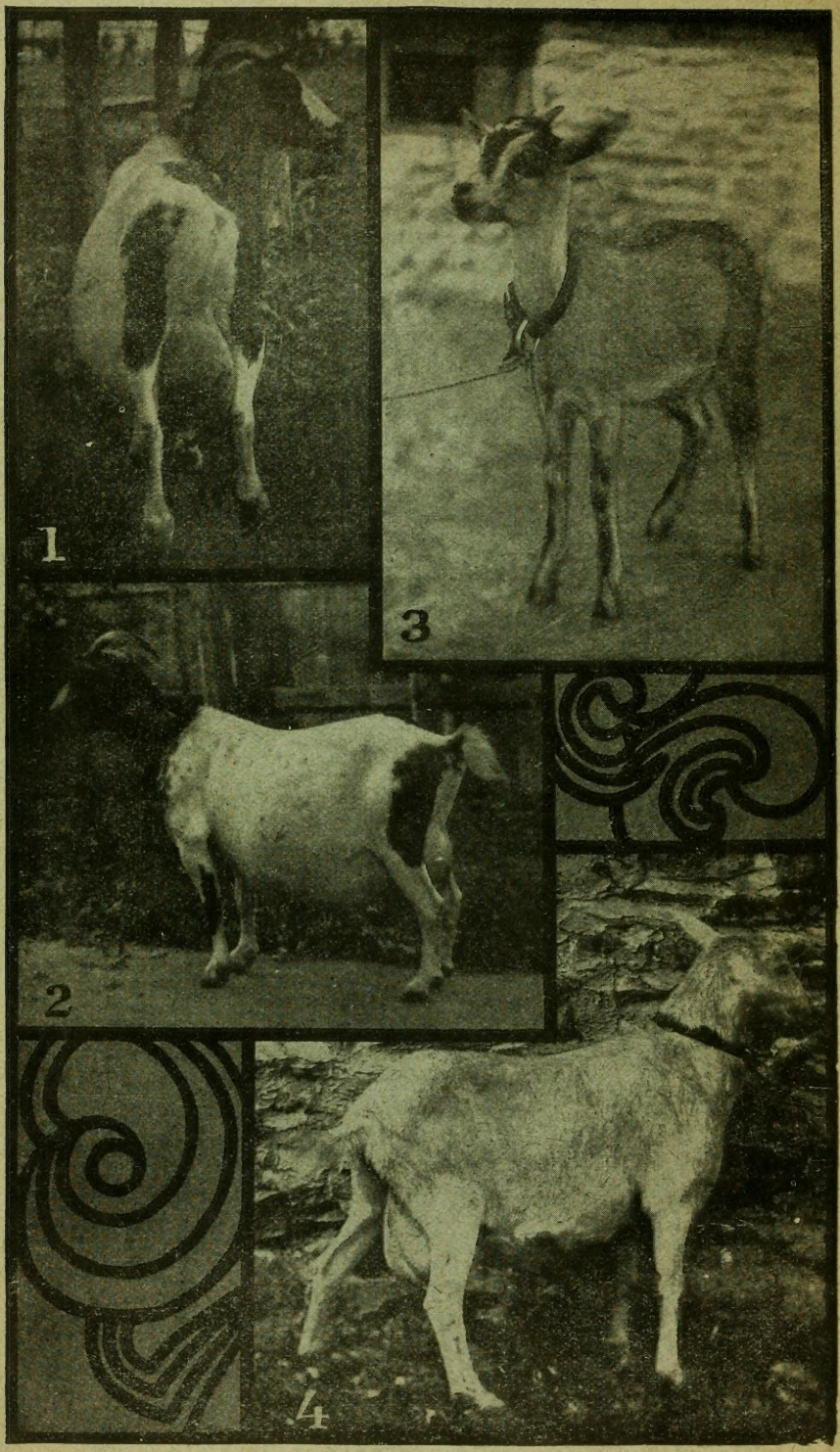
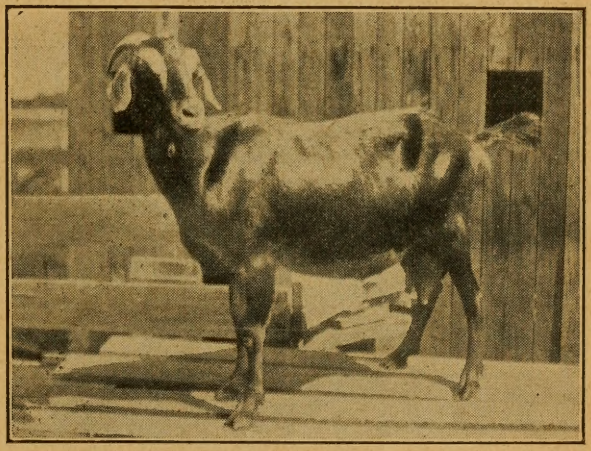


American Milk Goats Showing Various Markings and Types.

THE MILK GOAT DAIRY

THIRD EDITION

By G. H. WICKERSHAM, Wichita, Kansas



"Myrtle," a Very Fine Toggenburg-Nubian Cross, a Large Doe With Well Shaped, Large Teats That Make Milking a Real Pleasure.

PRICE FIFTY CENTS

"Go, little booklet, go,
Thou bear'st an honest name,
And everywhere, where thou hast went,
They're glad that thou hast came."

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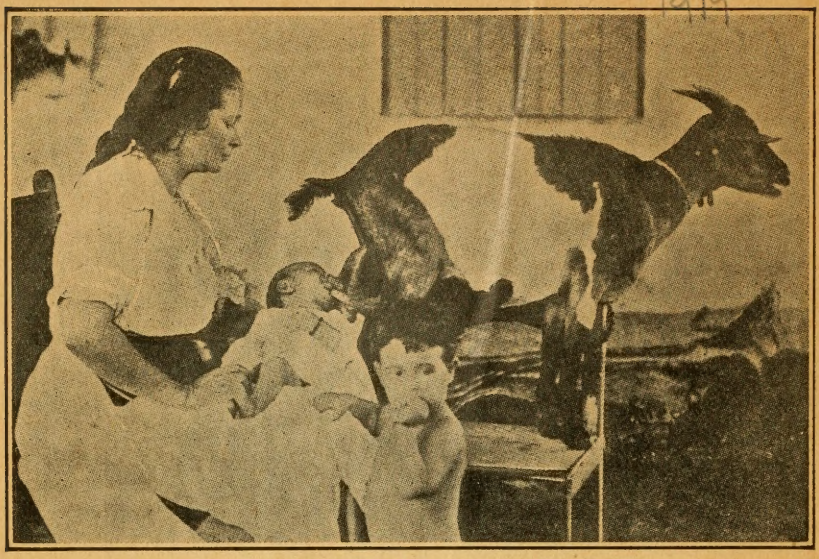

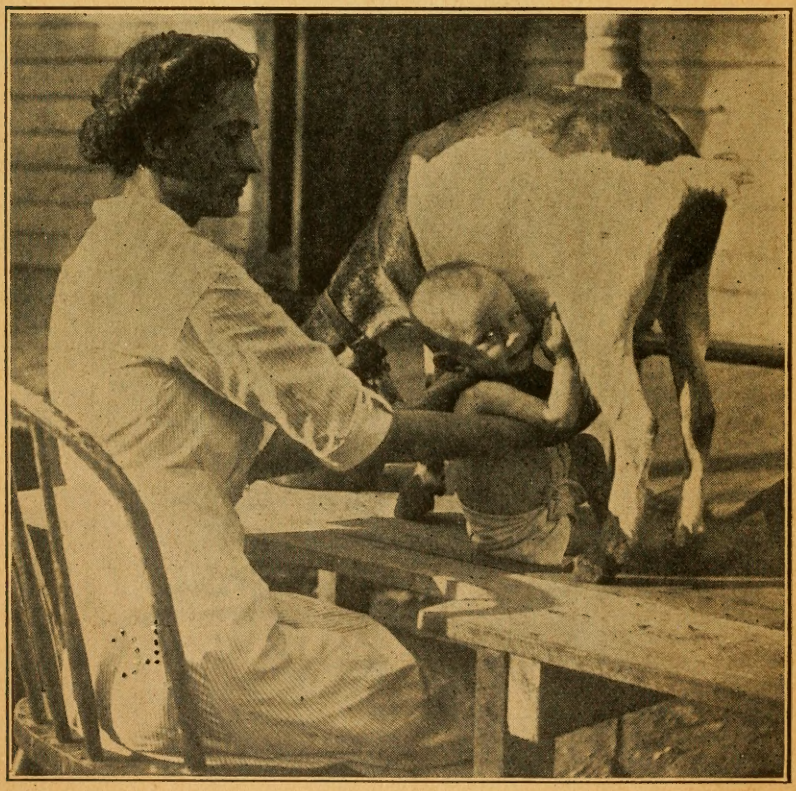

Methods of infant feeding practiced in Alexandria and in many foreign countries but not an approved method for our country.

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THE MILK GOAT DAIRY

By G. H. WICKERSHAM

IF there is one feature of agriculture more worthy of development than another it is the milk goat industry. Goats have been associated with man dating back as far as our most ancient history. In the scriptures goats milk is mentioned more frequently than any other kind of milk, showing that it has been used as an article of food for mankind from the most remote period. Three of the most important requisites of ancient man were supplied him by the goat; they were meat, milk and clothing, and in many countries today the goat is the chief sustainer of the inhabitants.

The milk goat industry in the United States is a comparatively new one, having received very little attention in this country prior to 1909, owing to various reasons. First of these reasons possibly is due to the fact that to secure importations from the countries where the best milk producing stock were to be had was almost impossible, as the inhabitants of these countries were loath to sell any of their stock to importers, just as it has been in securing and importing the Angora goats from Turkey and the countries where the best of its kind was to be had. Second: The importation of goats is forbidden or so hedged about with restrictions of the department of agriculture that there is great difficulty in securing the number of pure bred animals which breeders would like to have, but with the stock received prior to the laying of the quarantine some excellent milking strains are being developed. Third: The foolish ridicule that has always been attached to anything bearing the name of "Goat" has kept its true value as a milk producing animal more in seclusion, but since it has become an evident fact that the Angora goat industry is a grand success and is securely established throughout the country in general, many people have very naturally cast aside the idea that ALL goats are worthless and were guilty of making old shoes and tin cans their chief article of diet.

There has been so much ridicule attached to the goat for some unknown reason that people here have been slow to accept them. However they are beginning to come into their own, and a person can confess that he uses goat milk without fear of a sneer or a funny look greeting him. Physicians are helping along, for they prescribe goat's milk for babies and invalids when nothing else agrees with them. The people of the United States are at last beginning to wake up to the possibilities of the milk goat. We are the last civilized country to raise goats for milk purposes, for every other country from Bible days down have known them. Germany, Italy, Spain and Switzerland, where they are brought to their best and from where our best goats are imported. People of moderate circumstances in the suburbs of our cities are asking whether they can do better by keeping milk goats. The poorer classes of these suburbs, to whom milk is a luxury, are wondering if they can not find a blessing in a milk goat. With the miners in the coal districts

the milk goat is a proven friend. And while the milk goat is often called "The Poor Man's Cow," yet we find many of the wealthy classes now harboring the cunning milk goat and appreciating it's milk and friendship.

Prior to April, 1904, there were scarcely no pure-bred Swiss goats in the United States. In that month the first consignment of Swiss goats to our country was made, consisting of sixteen Toggenburgs and ten Saanen. Since this date only a few of the recognized milk goat breeds have reached our shores.

The husbandry of milk goats in some of the European countries forms the chief occupation of the people, particularly in Switzerland, the total area being only 16,000 square miles. This country is less than half the size of the state of Indiana, yet in 1901 it is officially stated that the production of goats milk alone was 19,875,000 gallons, and that the estimated value in that country of goats milk being ten cents per quart, it would equal nearly $8,000,000. The annual estimated value of goats milk in Germany is worth about $39,000,000. Spain, Italy, France and Norway derive a large revenue from the milk goat industry.

Some figures are shown here, quoted from Detweiler, which give some very interesting statistics with reference to the milk industry in Germany. They are as follows:

Value of Goats	$11,900,000
Value of Goat's Milk Products	35,700,000
Value of Goats Slaughtered	1,547,000
Value of Kids Slaughtered	1,785,000

This shows the importance of the industry in Germany alone.

ADAPTABILITY OF MILK GOATS TO OUR CLIMATE

THE milk goat is an animal that adapts itself very readily to most any climate that might be found in the United States. It is undoubtedly the most hardy of all domestic animals, thriving well in our most extreme northern states and in extreme southern. There are, however, a few species of goats native to Southern Europe, India, and Africa that can not be kept profitably in this country unless it be in our most southern states. Some of these breeds are our very best types of milk goat stock and by crossing them with our hardy northern breeds it is possible to produce the very best milking stock that will adapt itself to the various conditions and climate of the United States.

Swiss Toggenburgs, Swiss Saanen, Spanish Maltese, and Nubian cross bred goats thus far have proven to be very successful in this country. The above mentioned breeds do as well here as the Angora and are proving themselves to be a more remunerative animal. In some ways they resemble the Angoras, preferring as they do the higher lands and shunning any low marsh soils. They shun dampness in every form and would probably not prove themselves so well adapted to the low swampy localities of our country.

In 1909 our government located a milk goat farm thirteen miles out of Washington, D. C., with the idea of studying the possibility of producing useful milk goats from native stock with the use of sires of imported blood. The first step was to purchase a number of southern native does. During

1910 and 1911 milk and feed records were kept. In 1911 a pure bred Saanen buck was procured and in 1914 they had ten half blood Saanen does in milk, one of these does averaging over five pounds of milk a day on dry feed. In 1912 and 1913 part of these does were bred to a Toggenburg buck.

HEALTHFULNESS AND SUPERIOR QUALITY OF GOAT'S MILK

THERE is but very little question as to the immunity of the goat from germs of tuberculosis, in fact an eminent Paris physician states that he experimented by inoculating goats with virus of tuberculosis and that none of them ever showed any evidence or indications of having had the malady communicated to them by the inoculation nor has he ever found a goat infected with any other similar malady. Some authors claim that it is possible for goats to contract this disease, but it is conceded by the greatest majority of writers that the milk goat is free from liability to any of the diseases incident to or prevalent among other species of farm animals except the foot and mouth disease.

It has been a common practice to keep a goat about a stable of fine horses or cattle for the supposed purpose of warding off diseases and keeping the other animals in a perfect state of health. Many physicians recommend keeping one on the premises for the health as well as the amusement of children. This accounts to some extent for the fact that goats are to be seen in a great many of our larger cities in this country and among the families of the old world. The Swiss people attribute their remarkable good health to the constant association with the milk goat and the extensive use of the milk in their diet.

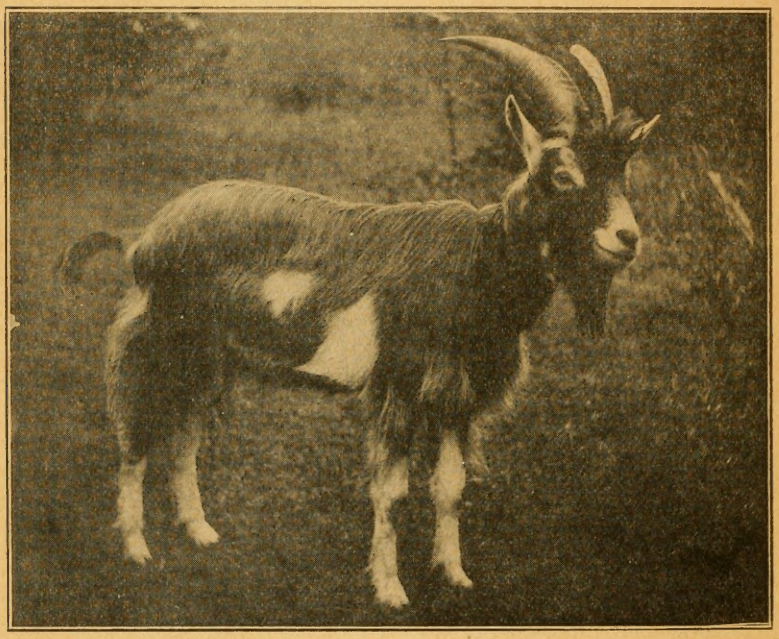
The facts as stated above show plainly why goats milk is superior to that of cows in that it is practically immune from the diseases that are prevalent with the cow and through the milk is transmitable to those using it.

The problem that is almost incessantly confronting the American people today is that of getting good pure milk. In most cases it is undoubtedly the fault of the milkman that so much milk should so closely resemble the contents of the pump, but through the agency of infection the cow will have to share some of the blame in producing milk that is not thoroughly wholesome. Milk, when it is pure, is one of the most wholesome of all foods; it is the first food of man and he is dependent upon it to a large degree throughout life. Would it not seem most necessary that the problem of placing in the reach of every one absolutely pure, sweet, wholsome milk be solved if such a thing is possible! To all intelligent people the fact is well known that the goat is practically immune from all infectious diseases and that goat's milk contains about double the nutriment as that of the cows. Then why wouldn't the milk goat solve this problem?

Nearly all foreign writers agree in their claims as to the value of goat's milk for invalids, children and for cooking and table use. Some of them regard it as most beneficial when taken medicinally for certain diseases and ailments. The claim is generally made that it is absolutely free at all times from the germs of tuberculosis. The milk is specially recommended for infants because of its similarity in composition to the mother's milk; and the literature is full of instances of success attending the use of the

milk with children that, previous to its use, were rapidly wasting away. Goat's milk is used quite largely in the hospitals in the Swiss and French Alps for tuberculosis patients and those suffering from stomach troubles.

"Doctor Boissard, obstetrician of the Paris hospitals, published last year a report on the results given by the use of goat's milk, and the latter were favorable. There is a special establishment in Paris where goats from the French and Swiss Alps are kept. The greatest cleanliness is observed, the jugs being washed in boiled water at milking time; the milkmen are obliged to wash their hands with soap; and the bottles and milk



"AFTON CURLEY" when one year old, a ⅞ Swiss Toggenburg and ⅛ Swiss Saanen buck, used by the writer in 1910 as a breeding buck; his progeny developed into good milkers, which has shown his prepotent powers. This buck is the result of scientific cross-breeding with the best of results.

cans are sterilized by being boiled in a solution of carbonite of sodium. It is a well-known fact that the goat does not readily contract tuberculosis, and this, of course, is a guaranty of some importance."—The Medical Times, May, 1902; Modern Medicine, July, 1902.

"Goat's milk has the advantage over cow's milk of being free from tubercle bacilli, and can be taken quite fresh. Contrary to general opinion, the taste is not disagreeable if the animals are properly selected and properly kept, being considered of a more delicate flavor than cow's milk. The quantity of fats, casein, and salt varies greatly in the different varieties

of goat. For infants and dyspeptics the weaker milk may be chosen, while the stronger answers better for debilitated subjects."—Paris Journal of Medicine.

The leading characteristics of goat milk is its delicious cream like taste, and the easiness of digestion, due principally to the minute size of the fat globules. They are so small that cream rises very slowly on the milk. This feature of goat's milk makes the ordinary method of separating the cream nearly impractical, but with the modern cream separator it is probably that this feature in regard to butter making, can be overcome entirely. The keeping qualities of goat's milk are about the same as that of cow's milk. But too much stress can not be put on the importance of cleanliness in milking, which affects to a large degree the keeping qualities of any kind of milk. The strong acrid taste often noted by people that have drunk goat's milk, either in our country or abroad, is without doubt due to two causes; that of uncleanliness in milking or improper feed. If the milk is drawn perfectly clean and kept in clean places, it does not have any unpleasant taste whatever and it would take a very exacting critic to detect it from the richest cow's milk. The flavor of goat's milk is affected as is the milk of the cow by the character of the feed. Because of the fact that the goat will eat most any kind of weeds and plants and if allowed to make that its chief diet, it is only reasonable to confirm the notion that some people have that goat's milk is poor in flavor and has a bad odor.

In most of the foreign countries the milk goat is allowed to shift for itself as best it can, which necessitates the animal eating much bad food which is nothing more than refuse. Because of its ability to thus secure a living and produce milk without expense to its owner, it is kept by those who are unable to provide better food for it.

The American people understand fully well the causes that produce bad flavored milk in cows and will not expect anything radically different in the milk goat. If the milking does are permitted to roam about the streets and alleys at will and feed upon garbage, shrubbery and aromatic plants of every description, good flavored milk could not be expected from either a goat or a cow. All these things have their influence upon the flavor of the milk.

"Many persons are impressed with the idea that this milk has a peculiar flavor, but this impression is entirely erroneous, for when drawn clean from an animal in health it resembles cow's milk, both in taste and appearance, the only difference being that it is richer, thicker, and slightly sweeter, containing as it does a larger proportion of sugar and cream and less water."—Pegler.

"The milk from goats fed upon what an English meadow or roadside yields has no flavor to distinguish it from cow's milk, except, perhaps, its extra sweetness and creaminess; in short, it is only distinguishable by its superiority."—Hook.

"An after taste of goat's milk, according to statements of veterinarians, should not exist, and if any such taste or smell exist it must be traced to unclean stables or bad food. Even cow's milk very frequently smells badly under these conditions."—Milch-Zeitung.

"It (the milk) possesses a singular but not unpleasant sharp taste, the strength of which varies with the feeding and keeping. The better the feed, the cleaner the bedding, the better ventilated the stall, and the more painstaking the care, just so much more pleasing will be the taste of the milk. The goatish taste is always to be attributed to the lack of attention to one or more of these points."—Detweiler.

"Innoxious, uninfectious, sanitary nourishment for the infant, the child, the invalid and the aged, has been until recently a reflective problem for the medical man as well as the layman. All the different stages of our existence depend not only upon nourishment, harmless in character, but its perfect assimilation for best results. The ideal food for our purpose is human milk, from healthy, unimpregnated mothers. Its only substitute of equal value is now offered and can be supplied from matured, healthy, unimpregnated milk goats. It is the only and reliable wholesome milk in reach. The statistics of the world are against the use of cow's milk today for food in the above mentioned classes.

"The fourth annual report of the District of Columbia Association for the Prevention of Tuercbulosis, and this is from the most reliable and highest source of information in the United States, tells us that one-fourth of all cases of tuberculosis among children under 16 years of age ,and one-eighth of all fatal cases under 5 years of age are due to bovine tuberculosis. And among children fed exclusively on cows' milk, nine out of ten cases of fatal tuberculosis revealed that five or 55 per cent, were due to bovine infection. The most noted authorities of Europe and America agree that the qualities of goats' milk lie in its chemical composition, its immunity from the danger of carrying the germs of tuberculosis make it the "ne plus ultra" or all foods. As a prophecy, remember that the goat will be the foster-mother and wet-nurse of generations yet unborn."—Louis G. Knox, M. D., D. V. S.

A prominent Buffalo physician says: "I take great pleasure in commending goats' milk for the infant, where other foods fail. I have resorted to goats' milk feeding in quite a few cases, and only recently have fed two premature (7 months' gestation) infants on this food with most flattering results."

A happy mother, Mrs. George Hoffman, wrote: "We cannot speak too highly of the use of goats' milk for premature infants. Our boy at one month old weighed 3¾ pounds, and at three months (after using the goats' milk obtained from the McKeand farm) weighed eight pounds."

To make a fair test of goats' milk, one must be sure that the milk has been prepared by the latest methods that are used in certified dairies. Under these conditions the milk is pleasant to the taste and has a digestibility second only to mothers' milk. Mr. J. L. Strutton, in the British Medical Journal, writes that in Alexandria the matron of the hospital says that babies in that city are fed direct from the goats, that is, by having the mouths applied to the washed teats. The article goes on to say that the babies are rosy and plump, rarely cry, just eat and sleep. This direct method of feeding cannot be carried out as a general practice, but the clean milk from sterilized bottles will produce good, strong babies. In comparing

goats' milk and cows' milk, Dr. Voelcker, analyst to the Royal Agricultural Society, says: "The cream globules in goats' milk are smaller than cows' milk, and as the milk is more concentrated than cows' milk, the cream globules are contained in a more perfect state of emulsion than in cows' milk, in consequence of which hardly any cream rises to the surface on allowing goats' milk to stand for twelve hours or longer."

It is this quality of goats' milk that explains the fact that it is more easily digested by young children than cow's milk. According to the report on this subject at the International Congress of Medicine in Paris some years ago, the following statement was made:

(1) The curd of cows' milk forms a dense adhering mass, which by agitation separates into clots that are but slightly soluble.. The curd of

"A GOOD SPANISH MILK GOAT,"
Bulletin No. 68, B. A. I., U. S. Dept. of Agriculture

goats' milk, on the other hand, forms very small, light flakes, which are soft, friable and soluble like those of human milk.

(2) The curd in both human milk and goats' milk, after agitation, is precipitated very slowly and incompletely, while the curd of cows' milk is precipitated very rapidly and completely.

(3) Digestive ferments when goats' and human milk were experimented with, digested these completely in twenty hours, while cows' milk showed only slight advance after sixty hours. The goats' milk approximates more in composition and digestibility to human milk than any other animal.

Another very strong argument in favor of goats' milk is the fact that goats are free from tuberculosis. The fact that goats' milk contains more proteid than cows' milk makes the food value, without question, greater than cows' milk. It is a fact that bottle-fed babies as a rule are underfed; that is, the amount of proteid is lacking in sufficient quantities because, undiluted cows' milk cannot be digested by an infant until the tenth month is reached.

In modifying goats' milk it has been my policy to base my modification on a 5% fat basis.

All weights herein given are in ounces.

For the first month:

Goats' milk, ½ ounce.
Boiled water, ½ ounce.
Lime water, ¼ to ½ ounce.

Feed every three hours

Lime water is gradually diminished until the second month is reached, when the formula is changed to—

Goats' milk, 1½ ounces.
Boiled water, 1½ ounces.
Mead's Depti Maltose, 1 teaspoonful.

Feed once in 3 hours.

I find malt sugar superior to either sugar of milk or cane-sugar in modifying goats' milk. Third month:

Goats' milk, 3 ounces.
Water (boiled), 1 ounce.
Mead's Malt Sugar, ½ teaspoonful.

Feed every three hours.

Fourth month:

Goats' milk, 5 ounces.
Water, boiled, sufficient to bring fats to 5%.

Feed every 3½ hours.

Each month, after the fourth month, gradually increase the amount of the feeding one-half to one ounce a month until eight ounces is reached. And then feed once in four hours. I find that eight ounces of goats' milk will satisfy a child of eight months and will continue to do so until the child has reached the twelfth month, when other food can be given in addition. My experience has been so satisfactory in using goats' milk that I want to recommend it generally to the medical profession.

CHAS. E. IDE, M. D.

In Dr. Eustace Smith's well known work on "The Wasting Diseases of Infants and Children," we read: "With some children, in spite of all possible precautions, cows' milk however carefully it may be prepared and administered cannot be digested * * * In such cases, if there are objections to a wet nurse, recourse must be had to milk of some other animal, and preference should be given to a milk which contains a smaller proportion of casein than that found in the milk of the cow, such as goats' milk."

The "British Medical Journal" of May 12, 1906, quotes with approval the following extract from a paper read by Dr. J. Finley Bell, of Englewood, New Jersey, before the New York Academy of Medicine, in which he gave reasons for recommending the more extensive use of goats' milk in the feeding of infants: "Dr. Bell reports two cases of wasting infants in whom improvment began as soon as they were put upon a mixture of goats' milk and water in place of cows' milk modified in various ways, and suggests that the fat of goats' milk being fluid at a point below the normal temperature of the body, may interfere less with gastric secretion, while it is not less digestible by the pancreatic juice. Other advantages which

he claims for the goat are. She is more docile, less excitabl, not subject to tuberculosis or other disease in this climate. Being browsers rather than grazers, they will thrive when cows would not; and, above all, she is cleanly. Her excrement is solid and her tail short; consequently she is not covered with manure, as is the cow. It is safe to assert that the production of cows' milk free from manure bacteria is commercially impossible. Not so with the goat; she can be easily washed (tubbed if necessary) and aproned for milking."

"I am quite certain," writes Dr. Lee, of the Children's Hospital, Great Ormond street, London, "that if a hundred children were fed on goats' milk, and compared with an equal number of corresponding ages (all circumstances being similar) who were fed on any other milk, except that of their mothers', the goats' milk children would, in comparison at least with those fed on cows' milk have an advantage."

A fuller explanation by Dr. Demande, director of the sanitarium at Haelbert, Belgium, which was read at the First Annual Congress for the Improvement of the Goat, has just been quoted by Mr. Holmes Pegler in the "Bazaar" (a journal which has given space to the subject of goat-keeping every week for many years). "It is not only," says the doctor, "that among the 300,000 goats of Belgium there is probably not one affected with tuebrculosis, while among the cows there might be anything between 50 per cent and 75 per cent of animals suffering or showing signs of this disease. Goats' milk being wholesome and beyond suspicion, there is no need to sterilize it. It may be taken raw, still palpitating with those mysterious forces which constitute life, whilst cows' milk, which needs to be boiled, sterilized—killed, in fact—is a congealed, defunct liquid. D'Escherisch, who has studied comparatively fresh milk and sterilized milk, has shown that milk is not merely a nutritive liquid, but that it is clear that children that are delicate have need of the ferments contained in raw milk, and are quite incapable of digesting milk rendered inert by sterilization."

The Dr. Demande mentioned has reported a number of cases that have come under his personal observation, in which children who seemed doomed to an early death while being fed on cows' milk grew up strong and healthy by the use of goats' milk.

It is not necessary to go outside of one's neighborhood to learn of many cases of mal-nutrition. A recent case coming under the writer's observation is typical. A four months old baby could not keep cow's milk, modified cows' milk or any of the commercial baby foods on its stomach. It became very weak and its life was despaired of. As a last resort it was sent to a baby hospital where a wet nurse was available but the baby continued to fail and after the baby had lost six ounces in weight it was sent home as hopeless.

The original doctor gave the case up. Another doctor recommended trying goats' milk. A very limited amount of goats' milk was obtained, and strange as it may seem, the baby retained it, although it was fed without diluting or modifying. In two days it had gained two ounces and in five days, five ounces. The baby has now gained a pound. An attempt was made to change to cows' milk, because the available supply of goats' milk was insufficient, but the baby could not retain it.

The color of goats' milk is nearly always pure white when a doe is "fresh" or has recently kidded. There are rare instances when the milk is tinged slightly with a yellow color.

ECONOMY OF KEEPING MILK GOATS

THAT goats' milk can be produced at much less cost than that of cows' milk is a great factor in favor of the milk goat. It has been thoroughly demonstrated that for the same amount of feed that one cow would require, eight milking goats can be kept. These eight goats will give more good rich milk than any two average cows, that is, the average dairy goat will give about two quarts a day, so the eight goats will give sixteen quarts of milk equal in richness to that of thirty-two quarts of cows' milk. The reader may easily draw a comparison between the profits of the milk goat and that of the cow as butter fat producers by multiplying the yields of one goat by eight. As a rule six to eight goats may be kept in very good milk producing condition on the same amount and the same kind of feed required to keep one cow.

Milk goats do not require an expensive stable or large pastures as is required by the cow. They may be sheltered in most any kind of a building or shed that might be available. It is not necessary to live on a farm in order to engage in breeding, raising or conducting a milk goat dairy, as these animals are contented with a small yard when given plenty of dry shelter, feed and kind treatment and adapt themselves as well to city life as when roaming over large pastures. This enables the goat dairyman to produce the milk near to the market. If a person has only a back yard on a city lot, enough food can usually be procured on this amount of ground to keep two or three goats almost the year round. Their food consists of almost everything in the vegetable kingdom. They prefer a large variety of vegetation, consisting of browse, weeds, and all grasses.

This preference to a varied diet gives the milk goat a great advantage over most any other domestic animal as regards economy, as weeds, grass and shrubbery can most always be found about the average city residence and upon the farm and can not be used in any other way, but would be otherwise destroyed; even leaves that fall from the trees are eagerly sought after. They prefer most kinds of weeds to grass when they can have their choice, and when snipping off the grass they will always take the tallest and coarsest first. Thus it can be seen that milk goats are a good destroyer of weeds, and objectionable grasses. Of course an entire diet of rank herbage would be likely to give the milk an unpleasant taste just as it would cows' milk if the cows were to eat such vegetation, but for stock not milking, let them eat what they will.

Hoffman, in his book on the goat, says that 75 per cent of the households in Germany are now keeping milk goats and it is not confined altogether to the poorer classes, but the prosperous middle classes consider the milk goat of great value to them in furnishing good nutritious milk.

The possibility of procuring a milk goat at reasonable prices in our country will, in years to come, be an easy matter and their low cost com-

pared to that of a cow will be within the reach of the poorest families. The milk goat gives considerable more milk in proportion to its body weight than the cow, and also utilizes its feed to much better advantage. It is satisfied with little feed and with feed that could not be utilized by other animals (provided it is not musty or soiled), which is to be had at much less cost than feed required by the cow. By keeping two goats instead of one cow, the family may be provided during the entire year with milk, with the proper regulation of the birth of the kids.

"As to the question of human nourishment, the goat occupies an important position. It yields a wholesome nourishment for the family, serves as a useful and agreeable occupation for wife and children, and awakens in its owner a desire for industry and a spirit of frugality. So long as the workingman is happy in the possession of a business, has a small bit of ground to call his own, and a profitable domestic animal, just so long will he be an opponent of social strife; a careful provider for his family, and an adherent of some recognized creed."—Hilpert.

"In Saxony the goat plays an important role as the source of the milk of the household; likewise that the homes that are here under consideration belong to that class of people who are without much means. Especially in the industrial districts of the mountains, with a preponderance of the smaller manufactories, the goat is the supporter of the family—in a broad sense, of the people among whom it finds its manifold uses. In this way it comes about that goats' milk is such a universally established food material, and one of which the people have become so fond, that they will pay the same price, (or in many places even a pfenning higher price), for it than for cows' milk, which latter serves to help out when there is a scarcity of goats' milk. The reason for this may be found in the higher nutritive value of goats' milk, and the assertion is often made here that anyone who has become accustomed to the use of goats' milk for coffee feels it a degradation if he is compelled to be content with cows' milk in its stead, which is not so pleasant to the taste and is poorer in fat than goats' milk. But the goat is beginning to rise in prominence and gain in numbers in highly developed thickly settled districts where the people are more prosperous."—Dettweiler.

COMPOSITION AND FLAVOR OF GOATS' MILK

THE ingredients and analysis of goats' milk vary with the different time of day when milk is drawn, by the particular part of the milk—whether the first or the last part drawn—and other minor causes.

In order to determine the percentages of fat in goats' milk as they appear in the various milkings in the morning, at noon and night, District Veterinary Dr. Loer in Weimar, made far reaching experiments and found, that the fat contents are the largest if the goat is often milked. A goat that is milked three times per day produces a richer milk than the one milked but twice and if milked four times per day, her milk-fat increases from six to eight per cent over the percentage if milked three times. In Denmark, where three milkings are the rule, from 10 to 15 per cent more fat is obtained than can be had in two milkings.

Another fact was established in discovering that the last milk from one milking is from ten to twelve times as rich in fat as the milk obtained during the beginning of the act. This should be borne in mind by all doing this work, as a clean milking out is absolutely essential to get all the fat. Dr. Loer also discovered that slow milking was preferable to fast milking, as it will, if persisted in for months, increase the quantity of the milk.

If the milk of a goat received from one milking, was divided into three equal parts while the act was going on, it was found that the fat varied greatly at various stages of milking, but that the last one-third of the milk was always the richest in fat. Here is one of his results:

Beginning of milking	2.3%
Middle of third milking	4.3%
End of milking	7.6%

An analysis of goats' milk from the British Goat Society with an analysis of cows' milk for comparison is shown in the table below. It should be stated that the cows' milk was from an animal which was a winner at a dairy show.

Elements	Goats' Milk	Cows' Milk
Water	83.21%	87.56%
Butter Fat	7.30%	3.63%
Casein	4.18%	.....
Milk Sugar	4.10%	8.81%
Ash	1.21%	.....
Total	100%	100%

Goats' milk not only contains a large amount of butter fat, but the composition of the butter fat is such as to furnish a highly nutritious food for all ages and classes of mankind. It is said to contain in one quart of goats' milk equivalent nutriments to one dozen eggs, or one and one-fourth pounds of the best beefsteak.

The flavor of goats' milk can be compared to that of the very best cows' milk when properly handled. An illustration of this is given in an article taken from "The Goat Keeper," in which a fussy old maid who could smell or taste things no ordinary human could, becomes prejudiced against goats' milk.

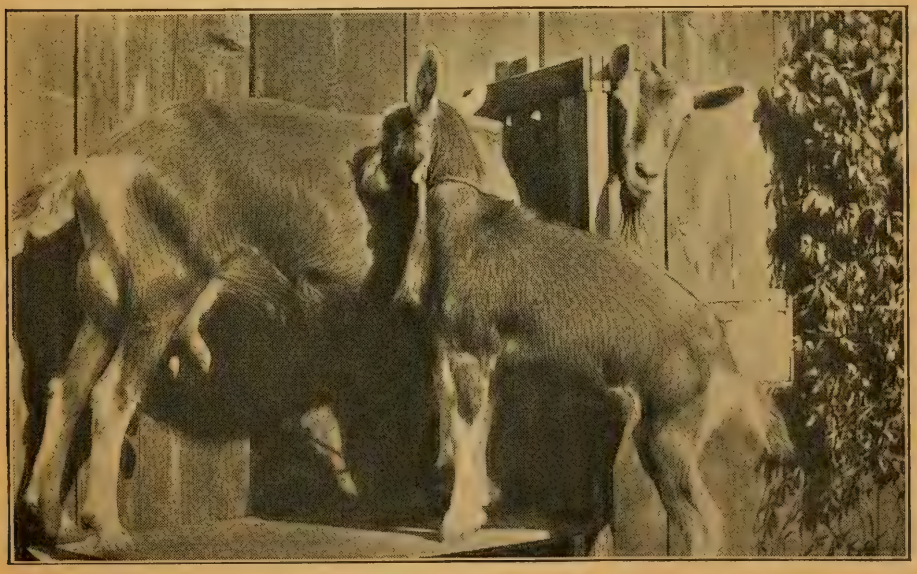
"Sister came to visit me again but I decided not to mention the fact that I didn't have to buy any more milk. I wanted to see what she would do when I offered her goats' milk without telling her what it was. I set goats' milk custard before her, goats' milk bread, goats' milk cake, and plain goats' milk, for her tea. Well, the first thing she did was to pour the milk into her cup of tea. She got too much milk in, so drank out some, and smacked her lips on it, then poured in her tea. I waited, almost breathless, for her to make a face and declare it was goats' milk, although it was perfectly odorless, just creamy milk. She never said a word, but I had hard work to keep from screaming with laughter. I had fooled her. If I could her, I could anyone Well, after the dinner was over, I told her I was getting almost three quarts of milk from one goat. 'What,' she said, 'was that goats' milk I had?' loud enough to have been heard one-eighth of a mile away. 'Yes,' said I quietly, although I was what they call 'bursting in-

side," 'everything was made of it.' 'Well, I would never have known the difference.' And she heaved a sigh as though exhausted."

DEMAND FOR GOATS' MILK

THE American people are beginning to comprehend the usefulness, economy and necessity of keeping milk goats for supplying their households with rich, delicious, healthful milk. It is not only the medicinal qualities of goats' milk that is creating such a demand for it, it possesses all the qualities that could be desired of a milk for culinary uses. The number of uses are so many that there can not help being a good demand for it in nearly every part of the United States. Of course in localities where the country is thickly settled, and especially near large cities, the demand for milk of any kind is very good, and here is where goats' milk is particularly in demand at good prices. Generally speaking goats' milk in such localities bring 20 to 25 cents a quart, while in more sparsely settled districts of our country it sells for less. Where milk is sold a better price can always be gotten for goats' milk if the purchasers understand that they are getting more "quality" for their money. Near some of the sanitariums where good sized flocks are kept it is often sold for from 60 to 75 cents a gallon, and where milk from certified herds is sold, in larger cities it brings as high as 15 cents for a half pint bottle, and 25 cents for a pint bottle. These prices are obtained usually where the milk is prescribed by physicians.

The demand for this milk will increase as the people become better acquainted with its superior quality over that of cows' milk.



A fine Toggenburg Doe and One of Her Kids.

PERIOD OF LACTATION AND YIELD

A VERY important requisite in selecting a good milk goat, is to choose one having a long period of lactation. This necessary quality in a milk goat is very often overlooked by buyers who are not familiar with the important merits of the milk goat, take it for granted that one yielding a large quantity of milk daily is the best milker, without considering the length of time this generous yield will continue. Well-bred goats yield a larger quantity and also continue the flow of milk for a much longer time than the more common, ill-kept goats. This is owing to the fact that they have been bred with a large yield and a long period of lactation as one of the leading objects in view. Among all breeds there are individuals that will excel in this particular, a fact that is not uncommon among dairy cows. The proper kinds of feeds supplied with regularity will do much toward lengthening the period of lactation, and those accustomed to handling the dairy cow know how necessary it is that the milking be done with regularity if a full and constant flow is to be maintained. As a rule the Swiss and Nubian breeds of goats have the longest period of lactation of any breeds of goats now in our country, which will vary from seven to eight months, and if not bred the period will often extend to ten months and sometimes longer. Usually the first month after a doe has become pregnant her flow of milk begins to diminish and will gradually grow less until within two months from kidding time, when she should be completely dryed off, but it is far better for the doe if she is dryed off 3 or 4 months before she is expected to drop kids.

It is often necessary to milk does three times a day when they are fresh, and with some it may be better to milk them that often for several months.

Where goats have been handled most intelligently in Europe for family use, the plan is to have not fewer than two does for each family. One of these should kid in the springtime and maintain a milk flow for not less than six months, while the other should be so managed as to kid six months later than the first one and also to maintain a milk flow for six months. This plan provides for a constant supply of milk, and is especially desirable if there are small children in the household—Bureau of Animal Industry Bulletin No. 68.

About the first question a person will ask in regard to a milk goat is, "How much milk will she give?" They might just as well ask, "How tall will a tree grow?" for it makes lots of difference what kind of a tree it is and how well it has been cared for, and it is just the same with the milk goat. This is, of course, a very important feature of the industry and one that varies considerably in individuals as well as with breeds. It is surprising sometimes the amount of milk a good milk goat will give in comparison to the size of the animal. From the writers' experience along this line it may be safe to say that the average dairy goat of the Swiss and Nubian breeds will give from two to four quarts a day. With the Spanish and native milk goats from one to three quarts a day, yet with some individuals much more is given. Some of the three-quarter and seven-eighth Swiss and Nubian does are the best to be found in America. Some of these does give as much as five quarts a day, but such a large yield is unusual and such an

animal is very valuable and it is a hard matter to induce a breeder to sell such a doe. She would be a good investment on $100.00. Selling her milk at 20 cents a quart would be an income of $1.00 per day, with feed cost of only a few cents. Then her kids, if sired by a buck of equal value, would be excellent stock. If a doe yields two quarts per day and has a period of lactation of from six to seven months she is to be regarded as a very profitable animal.

Owing to the fact that good stock has been very hard to secure from the leading milk goat countries, there are very few animals in our country that will produce the quantity that is claimed for them by the foreign writers, as their literature is full of instances of goats that yield five and six quarts per day, but as an average the best Swiss goats in Switzerland and Germany produce not far from three quarts per day. It is stated by German writers that the milk goats of these countries yield in milk from 10 to 16 times their body weight annually. With the cow the average weight of milk produced is 5 times its body weight. The average Swiss goats will weigh in the neighborhood of 66 pounds, which the reader can see is very light compared to the cow. Yet in its form the milk goat exhibits the complete type of a milk-producing animal.

"We in England have been breeding goats now for nearly fifty years with a view to improve the strain for milk, and we certainly have attained a wonderful result in this way at last, with 17 lbs. 8 ozs. in three milkings, and such like figures, and this at a show where we all know goats drop one-fourth of their yield compared with what it was at home. We have goats that have nearly touched 5 quarts in the day, recorded by weight and under observation so that there was no froth or imagination or fairy tales about it. But such goats have been produced by repeatedly crossing and re-crossing with the best imported stock. We have our 'Anglo-Nubians' (a term, I may remark, I originated some 36 years ago and now universally used), our Toggenburgs and our 'Swiss,' but none of these come up to the combination in all three in what we term Anglo-Nubian-Swiss and which embody the good points of these principal (with us) breeds.

"I have no doubt but that your American goat, when it is produced, in years to come, will equal, if it does not surpass, our own improved specimens, but it will take many, many years to become so established as to breed at all true to type and color.

"We in England shall watch your movements in this direction with the greatest interest, for you can do more than we can, inasmuch as your government is more reasonable on the score of admitting foreign goats into the country than ours. Our Board of Agriculture persistently refuses to permit us to land more goats from abroad, so we have to do the best we can with such stock as we already possess. I quite believe, therefore, that ere long, with your goat societies to give impetus to the movement, you will obtain some rare milking stocks, but I do hope that you will follow us in this: that you will give no credence to any statements as to extraordinary yields that have not been proved under the observation of judges at shows where the figures obtained may be regarded as authentic.

"H. S. HOLMES PEGLER,
"Hon. Sec. British Goat Society, Kingston on Thames."

The size of the teats vary,, and often a doe will have one large and one small teat, some times the small teats are as easy to milk as the large ones and do not interfere with the amount of milk that the doe is capable of giving.

THE MILKING OPERATION

SOME people might imagine that the operation of milking a goat would be a "back-breaking" task, but it should not be as hard as milking a cow since it is possible to take the goat anywhere desired. Before milking, the goat about to be milked should be placed upon what the milk goat dairymen call the "milking bench," which consists of nothing more than a platform or strong box about 18 or 20 inches above the ground. It is a very easy matter to entice the doe to mount the bench, as it is customary to feed a little grain while the doe is being milked, a handful of oats or corn, in a pan placed on the milking bench will be all that is necessary to get the does accustomed to come to the bench to be milked. The operation of drawing the milk is a very easy one, since the milker can either stand up or sit on a stool or chair, in a clean place, away from flies and other objectionable features that confronts the person who milks cows, yet the operating of the udder and teats is in no essential way different to that of milking cows. Sometimes a young doe will object to being milked, and in this case it may be found necessary to secure the doe by the head. A good contrivance often used is called a guillotine board, which consists of two boards with half-round notches, which when placed together fit around the doe's neck, the lower board is fastened securely, while the upper one may be fixed to lift up or down, so as to admit or release the doe. Other similar methods can be used and will suggest themselves to those accustomed to milking cows.

Before milking the two teats (the milk goat has but two teats) and the udder should be brushed off to remove any dirt that might be there, also strip the udder a few times from above downward. The person milking should see that the hands are perfectly clean and that the milk pail has been properly scalded and aired. The milking should under no circumstances be done in a dirty place and should never be done in the stalls or in the barn unless a separate part is partitioned off for the milking bench. The buck should not be allowed near where the milking is done, as his odor,—which is peculiar to only the bucks of the milk goats,—is apt to be absorbed by the milk, giving it an unpleasant, strong taste.

Regularity in milking is very important, and when does are "fresh" it is sometimes necessary to milk them three times a day, for if allowed to go too long at a time, the udder might become caked and the flow of milk would then decrease rapidly. A disregard for this feature will sometimes prove disastrous to a good milk-producing doe.

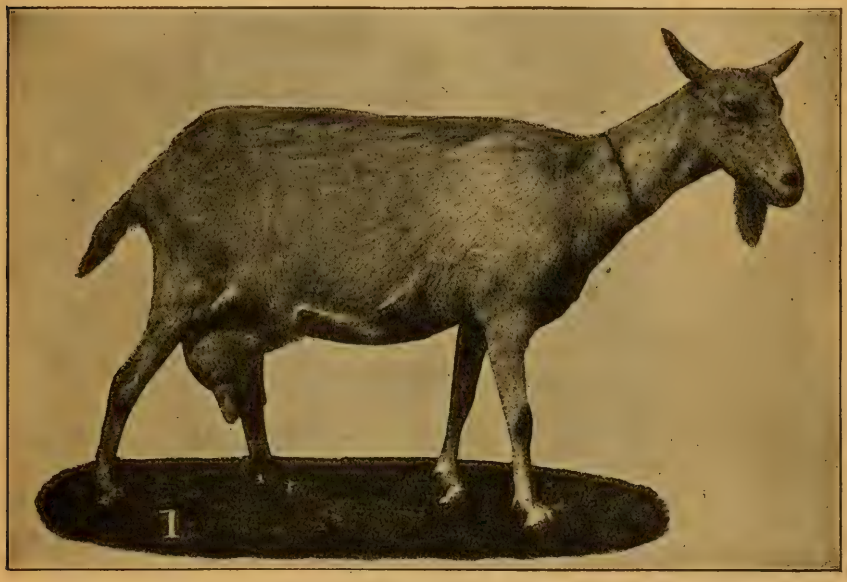
As a rule, milk goats are very gentle and of a kind disposition when handled and cared for so far as possible by the same person, and conduct themselves with extraordinary willingness toward the one who takes their milk in the matter of gratifying the whims of the suckling kids or of the person who milks them. The milking should be done with regard to gentle-

ness; if abused, they don't forget it, neither do they forget a kindness shown them. The strokes and tugs should be performed gently, and the milk is drawn best by the ordinary stroke directed from above downward.

LOCATION OF GOAT DAIRIES

GOAT dairies, without a doubt, will in a few years be distributed over nearly all parts of the United States. Good milk is an article of diet wanted in nearly every home in our country, and no other animal will produce so good a quality and so large a quantity at so small a cost as the milk goat.

That goats' milk is a very valuable medicinal food for infants, invalids, and convalescents, is a well known fact published by our best medical



"A GERMAN LANGENSALZAER MILK GOAT," by Dettweiler, Bulletin No. 68, B. A. I., U. S Dept. of Agriculture

practititioners. The cost of starting a small milk goat dairy need not be very great and it would be worth the while of our physicians to lend such an enterprise their support. Milk goat dairies are meeting with great success wherever established in the towns and villages of all Europe. Why should they not do so in this country? Our people are educated and know a good thing when they see it, and the only way to convince people of the superior merits of goats' milk is for them to try it. The people of our country want the best of everything, and the richest, purest, and healthiest milk is produced only by milk goats.

A few milk goats can be kept most anywhere, as there is nothing objectionable to their presence in the cities as would be in the keeping of

cows. They are a very clean animal and their quarters should be absolutely clean. The milk goat dairyman can carry on the business to good advantage when there is plenty of good range available, especially for the kids and bucks, but exceptionally profitable dairies may be conducted on small tracts of land consisting of a few acres of tillable land and some rough land, located near the larger cities or near sanitariums and hospitals, for wherever there are sick people that require the most nutritious of all food, goats' milk will sell at a fancy price, but milk goat dairies will be found profitable anywhere that there are people who wish good milk for culinary and domestic purposes as well as for medical uses.

PRODUCTS OF THE GOAT DAIRY.

THAT the products of goats' milk will be a valuable asset to our country in the course of time, there seems to be no doubt of, but for a few years at least they cannot be expected to attract much attention here owing to the fact that milk in itself is so highly prized and sought after. In the old countries goats' milk is used very extensively in the production of the very finest cheese. The famous Roquefort, Ricotto, Altenburger, Schweitzer and many other choice brands are all imported from France and Switzerland, and goats' milk enters almost exclusively into the composition of these choice brands.

On an estate near Lyons, France, 12,000 milk goats are kept in flocks of from 40 to 60 for the purpose of fine cheese manufacture. In the valleys of Switzerland and Norway, large goat dairies are in operation for the sole purpose of manufacturing cheese. To some extent the different flavors of the various brands of cheese are due to the different kinds of food consumed by the goats, which create a marked difference in the taste of the milk. In some localities the milk of ewes and cows enter into the composition of the various brands of cheese to create the different flavors, but it is conceded by the best authority that pure goats' milk produces a superior quality of cheese.

That the manufacture of cheese from goats' milk in our country would be quite a profitable industry in itself seems an assured fact, in view of the great enterprise and ingenuity of the American citizen in all lines of business. It may easily become so to an enlarged extent when goats' cheese made in America shall be offered in our markets.

It is claimed that the secret that the French have in the making of their famous French confectionery that seems impossible to duplicate in this country, is the fact that goats' milk enters into the manufacture of the candy.

The making of butter from goats' milk has as yet not proven a thorough success, owing to the fact that the cream rises upon the milk very slowly because of the minuteness of the fat globules, and therefore in order to secure practically all the cream the milk is permitted to stand until it becomes thoroughly soured, consequently the long period of setting injures the quality and flavor of the butter. It is possible that American ingenuity will overcome this difficulty through the agency of a modern cream separator.

A Herr Beil in Coelbe, Germany, who experimented for many years in goat butter production for his own household, relates in "Der Ziegenzuchter" as follows:

"We keep three goats which give us annually 2,400 quarts of milk. We milk them three times daily and use a small cream separator twice a day. The noon milk is kept till after the night milking in a cold cellar and reheated a blood heat, when it is together with the evening milk run through the separator. The cream thus gained we keep for one week in the cellar where it sours nicely. As soon as we have sufficient cream on hand and of the right quality we begin butter making. Of course pure goat butter is white, and in order to give it color, we use for two quarts of cream our coloring matter made as follows: One tablespoonful of a yellow carrot, finely shaved, placed in a small pot, over which we pour boiling milk, left to stand fifteen minutes, then poured through a cheesecloth. This will give an excellent and rich color to the milk and it has the advantage of being wholesome and very tasty in the butter. The butter is made just as with cows' milk.

"The remaining buttermilk, unless used as a drink, can be made into a very appetizing cottage cheese or it may be thickened and formed into the so-called handcheese. Caraway seeds added to the handcheese give it an excellent flavor. The skimmed milk, especially if not too strongly skimmed, can still be used as an addition to coffee or be used in the kitchen generally."

There are now several condensed milk factories in the United States using goats' milk, which is condensed and sold for infant feeding. Many thousands of infants are compelled to live during their first few months on condensed cows' milk, and it is not the best food for their stomachs.

They whey of goats' milk is highly recommended by foreign authorities for its nourishing and medicinal properties. Zurn says it is recommended especially for diseases of the lungs and for anemic persons suffering from innutrition. Thus it is seen that not only goats' milk but its products are very valuable as food and medicine.

HARDINESS OF THE MILK GOAT.

THE hardiness and healthfulness of the goat might be ascribed largely to the great amount of exercise and fresh air that it gets in gathering its food, and the large variety of food it secures in this wandering about. The goat chooses the high land when it has its preference, where the air is generally pure and good, and the freedom of the goat from disease is consequent from the above conditions. But it cannot maintain this degree of hardiness without a sufficient amount of exercise, fresh air and its choice of a varied diet. While the milk goat is a hardy animal, it must be understood that the best results cannot be obtained without a certain degree of care and protection. It should be provided with good shelter, easy of access at all times from storms and extreme heat or cold. These requirements are necessary in the rearing of the young kids and in obtaining from the does a large and constant flow of milk. In fact, the same amount of protection should be given the milk goat as is customary in well kept cow dairies.

The goat has been given too much credit as to being able to thrive upon "any old thing." Its playfulness is removing labels from tin cans, pulling clothes from a line and many such pranks has led some people to believe that it really eats such things, but any person accustomed to its habits will readily see that it eats nothing but the cleanest of food refusing anything that is soiled in the least. The hardiness of this animal must not be overdrawn, but there is no doubt but that the milk goat will thrive and be very profitable to its owner on far less expensive feed and be contented with less care than any other farm animal.

There are very few diseases that affect goats of any kind. Possibly the disease that gives the most trouble is called Malta fever, which occurs in the tropical and sub-tropical climates. The following extract on Malta fever is from a lecture by Dr. J. W. H. Eyre, bacteriologist to Guy's hospital, England, delivered in March, 1909, before the Royal College of Physicians of London. This lecture is copied from "The Book of the Goat," by H. S. Holmes Pegler, honorable secretary of British Goat Society.

Dr. Eyre is of the opinion that "Melitensis septicoemia (Malta fever) is primarily a disease of the goat which had its origin in the Persian hills (the Persian wild goat, Capra oegagnus) and which accompanied that goat on its world-wide wanderings, remaining potentially active for man so long as its host preserved its original habits in barren rocky countries in the tropics and subtropics, where pasturage is of the scantiest, and consists chiefly of shrubs and weeds. When, however, the goat reaches those temperate climes and abundant pasturage which are so pre-eminently suitable for the propagation of the cow and promiscuous in-breeding is entirely avoided, the micrococcus no longer finds a suitable habitat in the caprine mammary glands, and rapidly disappears."

Dr. Eyre further states that no case is on record of any person having been attacked by this disease from drinking the milk of goats in England.

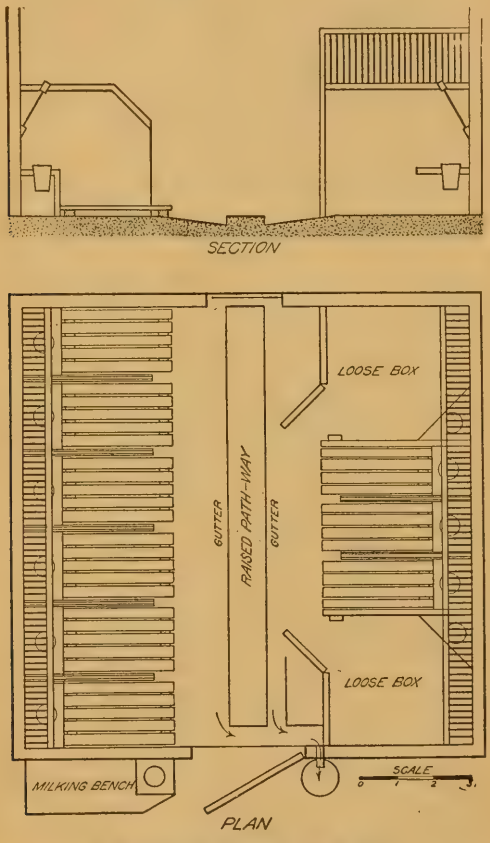
From the foregoing it must be argued that there can be no danger whatsoever from drinking milk from Swiss breeds of goats if the goats are given proper care the same as would be given to milk cows, for the disease of Malta fever is essentially a disorder found only among goats imported from a tropic or subtropic country where conditions are such that feed is exceedingly scarce, and where no attention is given to the proper care or breeding of the goats.

Malta fever is not found among the Swiss breeds of goats, nor in those latitudes of Europe where the temperature drops below the degree of frost.

MANAGEMENT OF THE GOAT DAIRY

IN speaking of a goat dairy, the goats themselves are of course the most important feature, but next to them, a modern goat barn is a necessity in the operation of a good milk goat dairy, but is not necessarily an expensive structure. It should be convenient, well lighted and ventilated and its dimensions can be regulated by the size of the flock. The milk goat dislikes rain or mud and will avoid contact with either when it can. Everyone knows that cows do not give the best results in milk when exposed

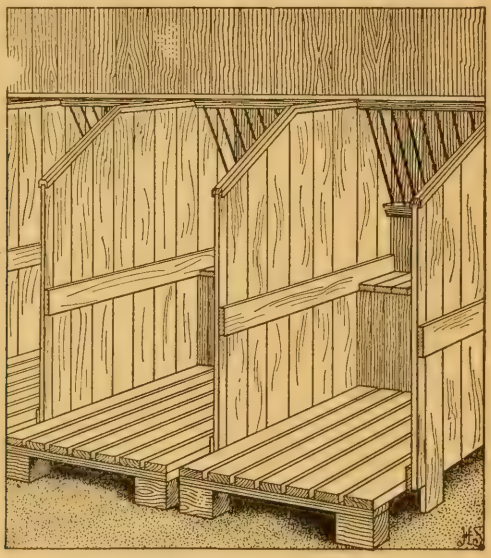
to all sorts of weather, and the same principle applies to the milk goat, which is a far more sensible and intelligent animal, and absolutely refuses to content itself with unclean conditions when it is avoidable. It is then best in arranging the goat barn to provide one that can be easily kept in a clean and sanitary condition. The matter of ventilation is of prime importance since the goat suffers when it is deprived of an abundance of fresh air; there should be windows, allowing plenty of light and sunshine to enter the building, as goats dislike a dark building.



"PLAN OF GOAT HOUSE"
From Hook, Bulletin No. 68, B. A. I., U. S. Dept. of Agriculture

An ideal goat barn is shown in the accompanying cut taken from Bryan-Hook, which the writer considers very satisfactory for a small goat dairy accommodating from 8 to 10 does. Of course it can be made larger to accommodate as many goats as desired. The dimensions can be 10x12 or 12x12, and the building can be made of any material that ordinary farm buildings are made of. If possible the floor should be of cement, sloping

from the head of the stable to a gutter in the center of the building. The gutter can be sloped to one end of the building and empty into a tank on the outside if the owner wishes to save the manure, which is a very valuable fertilizer. With an old broom the barn may be easily kept in a clean condition.



"STALLS FOR GOAT HOUSES"
From Hook, Bulletin No. 68, B. A. I., U. S. Dept. of Agriculture

The stalls are usually made from 18 to 24 inches wide and each one should be provided with a low portable floor made of narrow pieces of lumber with a small space between the pieces to allow the liquid manure to pass through. This floor should project beyond the sides of the stall far enough to allow the does room enough to stand upon it. The stalls should be provided with a foot-board with a rack above for feed. This rack is almost indispensible in feeding milk goats. The hay in it is easy of access and not so much of it will be spoiled by the goat getting it under her feet, for a goat will not eat feed that has been trampled upon. The rack can be made of ¼ or ⅜ inch iron bars or a piece of heavy wire fencing. The foot boards should be 12 or 14 inches wide. A hole should be cut in this board to place a bucket or similar vessel from which to feed grain or vegetables. The foot-board should be strong, as the doe will use it to place her feet upon in reaching for feed in the rack above. This is a natural position the goat prefers in securing its feed. It is an easy matter to feed into the racks from above, if there is a loft to the barn. The does are fastened with a short chain through a hole in the footboard, the chain connecting with a snap ring placed in the collar, which the doe always wears. Each animal should always be fed in its own individual stall, because if they are fed

together they are apt to injure each other and some will predominate over others, causing the weaker to lose their share of the feed.

The loose boxes are arranged for the young kids and does that are soon to kid, as at that time each doe should be by herself.

Attention is called to the milking bench on the outside of the barn. This bench can be placed under cover by making a sort of lean-to off from the barn, or the milking can be done in a nearby building. It is always best to do the milking away from the stalls and other goats.

In connection with the barn a good yard should be provided, or if the dairy is in the country, a good pasture, where the goats may get air and exercise. If there is a platform or some boxes in the yard the goats will find them a source of pleasure, as they prefer to lie upon something high and dry. A doe will go directly to her own stall at feeding time where it can eat in peace, and at the same time get all the feed that is due and no more. The comfort of a goat cannot be added to by giving her bedding in the stall for she will paw it away. For the purpose of absorbing the liquid manure that does not pass below the slatted platform, chaff or sawdust might be used, but they are probably more bother than a benefit.

FENCES FOR MILK GOATS

IN building a fence to retain goats it should be so constructed that it will not only keep the goats in, but also keep their enemies out, such as dogs and wolves.

Woven wire is one of the very best fences, especially if the meshes are not too far apart near the bottom, as goats with horns will become fast if they can get their heads through. A woven wire fence that is three feet high with one strand of barbed wire on top makes a very good fence for goats, or if made of barbed wire entirely ten strands with posts set 18 to 20 feet apart and having three stays between is a good one. The lowest wire should be one inch from the ground, the next four or five wires 3½ inches apart, and each strand higher up can be spaced ½ inch more, gradually making the strands farther apart.

Sloping rails and boards should not be placed about the fence, as a goat can climb such objects, and if one leads the rest are sure to follow, and it can be depended upon that they won't forget where it is. The fence should be tight close to the ground, as they are crawlers as well as climbers, and they often astonish people by their success in crawling through small openings. Such places would allow entrance for dogs which sometimes worry the kids and should never be allowed in the goat yards.

BREEDING AND MANAGEMENT.

IN the breeding of milk goats, as with any other breed of domestic animals, it is very essential that the best buck possible should be employed.

There is nothing so important in breeding up good stock, and positive evidence that the buck is from a strain of stock having well known milking records of amount of milk given by the dam, granddams, and other female

relatives of the buck should be known and are valuable facts. Never breed your does to a poor buck. He is absolutely the foundation of the flock and the best is never "too good."

The bucks of all breeds of milk goats are in heat at all times and the does come in heat about every three weeks, excepting possibly the extreme hot weather of July and August. To prevent the kids coming at undesirable times the bucks should never be allowed to run with the does. It is necessary that breeding be done according to a schedule, so that a supply of milk might be had when wanted, either for family or dairy use. One good buck, if properly managed, will look after as many as 50 or 60 does in a year, but it must be remembered that the does should not be bred oftener than every 7 or 8 months. If bred oftener too much strain is placed upon the does and the best results cannot be expected by the practice.

The presence of the buck about the barn where does are kept is very objectionable. The odor which he emits is readily absorbed by the milk and is one of the sources of bad flavored milk. His place is in a separate barn and separate yard altogether. The odor emitted by the bucks is due to certain glands in the skin of the animal which secrete capric acid or hircine.

At the time of the terrible epizootic epidemic among horses in the eighties, when large numbers of horses died, it was claimed that the stables in Boston which had male goats were free, or nearly so, from the plague's ravages, and the presence of the goats is given credit for it. Some of these stables keep goats today. It is an old English idea.

The Does—To a certain degree the same characteristics required in the buck should be present in the doe. She should be from as good milking stock as can be secured, but if she should be only a fair milker, the offspring might become better if the buck is a superior animal. Thus it it possible to "breed up" if only the best bucks are used.

In order that a constant supply of milk may be maintained the does should be bred so as to drop kids at regular intervals, both summer and winter. This is quite an advantage in milk goat dairying with the household. Two or three goats properly managed, will furnish a bountiful supply of excellent milk the year round for an average family.

The Kids—Owing to the high price of goats' milk, it is often customary to raise the kids on cows' milk, which is a very easy matter to do. An ordinary nursing bottle is very good to use until the kids learn to drink. Care should be exercised to see that the bottle and the milk are always sweet and clean.

An excellent substitute for milk is to be had in "Blatchford's Lamb Meal." (See the advertisement in the back of this book.) This meal is very easy to prepare, can be fixed with either water or skim-milk. Kids and lambs do well on it.

"In feeding 'Blatchford's Lamb Meal' to kids the writer finds that at first it is best to mix the meal with milk of any kind that is fresh and sweet. Feed from a shallow pan not over 3 inches deep, and fill only half full at first. Have the feed about the temperature of mothers milk, it should be very thin at first so the kid can drink it easily, then gradually thicken it by

adding more meal, and as the kids become older add grain, such as oat meal, corn meal, etc. Teach the kid to drink very much as you would a calf, by letting it take your finger in its mouth and then coax the kid to put its mouth in the pan, once the kid gets a taste there will be no trouble after that. It is a good plan to keep the Lamb Meal before the kids in dry form all the time. One method which has proven very satisfactory is to put a nipple on a short piece of garden hose, a hole is then made about half way down in a pail or bucket, the hose is inserted in this hole allowing the nipple to extend on the outside of the pail, the pail should be securely fastened in some manner so that it will not be upset.

As soon as the kids are old enough to eat they should have some green feed if it is available. Leaves, weeds or grass will furnish a mixture of diet which is very essential for goats to have at all ages of life. Grain may

"A SWISS GUGGISBERGER DOE," by Hilpert, Bulletin No. 68, B. A. I., U. S. Dept. of Agriculture

This breed is very similar to the Swiss Saanen, except that they are of various colors and markings while the Saanen is pure white.

be fed to the kids if a scarcity of pasture prevails. Oats, corn, kafir corn, and in fact any kind of grain will be readily consumed but exercise judgment in feeding and don't feed too much grain. Weaning is done when the kids are from two and one-half to three months old, depending upon the season of the year in which they are born. After the kids are two or three

weeks old they begin rapidly to develop a hardy nature, but prior to this time they are a very delicate animal. Cold rains upon them is almost certain death. They must be kept dry and warm and well nourished, but after they are three weeks old they are as hardy as any domestic animal.

Keeping one goat alone is not so good a policy as they are sociable animals and like company and are more contented and do better when two or more are together. If they are perfectly contented better milking results are possible.

TIME TO BREED AND AGE

LITTLE further need be said regarding the times of breeding since the goat dairyman can arrange that matter to suit his individual purposes. Of course some does have longer periods of lactation than others, which will necessitate the dairyman breeding some does oftener than others. Sufficient to say, the milk goat can be bred any time in the year, excepting some times they do not breed in the very warmest weather, but this is only from six to eight weeks as a rule.

If a doe is bred at the age of one year, she will drop her kids five months later, which is considered young enough, if the purpose of milk production is the prime factor. A buck may be put to service at ten months old, but it is better to wait until he is 14 to 18 months old. Care must be exercised not to allow breeding at too young an age, which is apt to occur if young bucks and does are allowed together after five months old. The young bucks will sometimes serve when much younger than this.

No other animal, perhaps, develops younger than a goat and they will often breed at three months. Of course this should not be allowed. Breeders differ as to the age they should be bred first, some contending they should be two years old, others from ten to twelve months. A doe will not do her best until the third kidding. If she gives one and one-half quarts with the first kid she will usually give two and one-half or three by the time of the third kidding. When bred at an age before the bones are sufficiently hardened, the extra weight of carrying the foetus bends down the back bone, and not only deforms the doe permanently, but stops her growth. A great many breeders make this mistake. In the judgment of the writer a doe should be about 18 months old before being bred for best results.

The period of gestation in milk goats is five months, or the same as with sheep. The does are in heat about every three weeks and the period last from two to four days, depending upon the season of the year. A doe will remain in heat longer in the fall or winter than any other time of the year.

NUMBER OF KIDS BORN

MILK goats as a rule drop two kids at a birth, but occasionally three are dropped. In fact, cases where three are dropped are more numerous than where only one is dropped.

Instances are on record where very fine milk goats have dropped as many as four kids at one time, but such instances are rare.

With two kids at a birth it is readily seen how fast a flock of milk goats will increase when allowed to drop kids every nine months, or three times in two years. For best results in milking qualities it is not considered best to allow them to breed oftener than this. Usually the twins consist of one male and one female, but it often happens that there are two males or two female kids.

Some breeders are apt to believe that the kids will take care of a doe's udder and no oversight is necessary, especially if there is more than one kid. This might be all right with a doe yielding a small flow but to permit a heavy milking doe to go unmilked, trusting to her kids to properly relieve her udder, is gross carelessness, and will cause irretrievable injury. Often young kids will nurse the same teat and not touch the other teat, in which case that side of the udder must be milked clean at least twice a day.

FEED FOR MILK GOATS

BY actual test it has been proven that eight goats will subsist upon the same amount of feed required for one cow, and at the same time yield a good flow of excellent milk.

The same kinds of feed required by a cow are usually used, but it is very essential that the milk goat be given a larger variety of feed than that which the cow usually gets.

Milk goats have the same ability and appetite for destroying worthless brushwood and weeds as that of the Angora goats, and such feed may be very desirable for growing animals, but for milking does, a sole diet of such feed would be very likely to impart an unpleasant taste to the milk. The milk-goat is a single-purpose animal and cannot produce good milk and at the same time destroy brushwood and weeds to any great extent. In the summer season a pasture of clover, alfalfa, meadow grass, or even crab grass are excellent milk producing feed, and if such pastures are comparatively free from weeds there will be no unpleasant flavor to the milk. It is where does make weeds and brushwood their sole diet that the milk will have the unpleasant taste that is often spoken of. When pasture season is over, the best results from milking does are obtained when feeding is done in the barn. Prairie hay, when sweet and properly cured, is an excellent feed, and more so if it is made up of considerable slough grass, which the goats will pick out first. Many Swiss dairymen mix straw with the hay which is a good plan, as the more vareity given the better pleased are the goats. Alfalfa and clover hay are excellent; indeed very little grain will be required when either of these are provided. Kane, kafir corn and Indian corn fodder are very good feeds, and are considered very economical feed for goats. The only trouble is in feeding such coarse feeds from the racks, however, the writer has found that with such feeds the stalks may be broken a few times and very little trouble will result. When fodder is fed that contains a few nubbins, scarcely any additional grain is required. In feeding grain the same discretion is required in feeding milk goats as in feeding cows. It should be the right kind and not given in such large quantities as to produce too much fat rather than milk. Bran, when moistened with a little salt water, is a most excellent feed, but its use will depend

upon its cost. The amount of this feed per day should not be more than one-half pound for each animal. Oats and kafir corn are especially good feed for does, both milking and those that are dry. From one-half to three-fourts of a pint per day will be a good feed. Corn is also excellent for all goats and not over three-fourths of a pint per day should be given.

In feeding grain it might be well to vary the feeds by giving as many kinds of grain as the dairyman can secure at a reasonable cost. The writer considers the feeding of grain very necessary, but should not be given in large quantities. When plenty of roughage, such as hay, cane, or fodder is at hand, the milking does need not be fed grain oftener than twice a day, and when such nutritious feed as clover or alfalfa is fed, not more than once a day and very little then.

Meal, oil cake and linseed cake, are highly favored when fed to does before delivery, on account of its digestibility and ready assimilation. It also stimulates an abundant flow of milk.

"Bltachford's Lamb Meal," when fed to does just before the delivery of kids and also after kids are born, is excellent for conditioning does and for increasing their milk flow.

Such roots as parsnips, potatoes, carrots, swedes, mangels, and especially turnips, are an excellent feed. They must be clean and free from dirt or decay. Mangels should not be fed earlier than the first of January, as they will sometimes produce scours if fed too soon after pulling. Clean and fresh refuse from the kitchen, such as potato, apple and turnip peelings, pumpkin and squash rinds, cabbage leaves and crusts of bread are eagerly eaten. For one or two milk goats the waste from a moderate sized garden will supply the greater part of the food. In thinning out carrots, beets, turnips or suckers from sweet corn and cabbage that did not head, the lettuce and spinach that have bolted, lawn and hedge clippings. In fact nearly everything that is clean can be fed, but of course judgment should be exercised in feeding to does that are giving milk, anything that might impart an unpleasant taste in the milk, just as would be the case with a dairy cow. It must be understood that a goat will eat many rank plants that a cow will not.

Little is necessary to say in regard to the feeding of the buck, other than that he should have plenty of rough feed, and occasionally a small amount of grain, especially when serving a large number of does. If the dairyman has a brush or weed patch, let the buck reign there.

The kids should have some grain until they are four or five months old, but will need very little after that if given plenty of roughage, until they are old enough to deliver kids.

The fact must be borne in mind that if satisfactory results are to be obtained in milk goat raising, the animals must receive the same rational treatment that is received by other livestock when best results are sought. The milk goat is a hardy animal to be sure, but this characteristic only enables it to respond the more quickly and satisfactorily to careful and judicious treatment.

Some of the favorite grasses for goats are sheeps' fescue, a short, fine grass which grows in a tuft at its roots and pushes up delicate stems rarely

exceeding a foot in height. Also the hard fescue and the red fescue, the meadow foxtail, the wild oat, rye grass, and especially the sweet scented vernal grass. All these grasses impart a fine flavor to the milk. In fact there is scarcely any grass that milk goats will eat that will in any way injure the flavor of the milk.

Raise alfalfa and oats,
Children and goats,
"Assimilate the good."

"MALTESE MILK GOATS," by Reeves.
Bulletin No. 68, B. A. I., U. S. Dept. of Agriculture

WATERING AND SALTING

THE milk goat might be termed a "crank" in the matter of choosing its drinking water. It has been noted where animals have been nearly famished for want of water, when a supply was within easy reach but had become slightly polluted. They want it fresh and absolutely free from any kind of filth. Does giving milk should be induced to drink as much as possible, and pure water should be easy of access to them at all times. The same will apply to the bucks and kids.

Besides fresh, clean water, a perfectly clean pail should be used. A vessel in which water stands almost continuously becomes very foul. Simply rinsing with water is not sufficient. Scalding occasionally with borax, saleratus, washing soda, or in a bad case chloride of lime is necessary. The latter is the most effective agent for killing the yeast plant and other slimes which cause the putrid smell of stagnant water. Emptying the pail and keeping it dried out most of the time will keep it sweet.

People who have never had the care of a milk animal often do not realize the importance of regular watering. When a goat is giving a goodly amount of milk the demand for water is very great and the failure to supply good water a few times will have a serious effect upon her flow of milk.

Goats require more salt than most any other animal owing possibly to the more astringent character of the food. While loose salt can be given either with their feed or by itself, rock salt is preferable, as it can be placed in boxes or troughs raised from the ground, and then be kept out of the dirt, and of course be easy of access to the goats at all times. Then too, there is no waste and not so much danger that the animals will eat too much of it. However, if they have been deprived of salt for any great length of time, they are likely to over-do the matter if allowed free access to an abundance. The dairyman should exercise good judgment in this matter, but by all means give them plenty of salt.

It is a good idea to add a small amount of lime to the salt every month or so, and it is recommended that one part of sulphate of iron to 100 parts of salt is a good tonic for the goats and will assist in keeping them free from worms.

Dr. Holland's Medicated Stock Salt is a splendid worm destroyer and conditioner and if kept before the goats at all times serves a double purpose in supplying them with the needed salt and stomach worm destroyer.

LOOKING AFTER THE HOOFS AND DIPPING.

THE hoofs of milk goats will occasionally need paring down, as the hoofs will usually grow to great length, turning back under the foot and creating a place where dirt will accumulate and will sometimes cause foot-rot, and will interfere with the movements of the animal. It is a very easy matter to look after them every month or two, since it is necessary it should never be neglected. Where goats have abundance of gravel and rocks in their pasture, the hoofs will not need much attention as the constant grating on the rocks will keep the hoofs worn down.

Pare the bottom of the hoof down until the foot looks to be of normal and symmetrical shape. The front line of the hoof stands, normally, at an angle of something more than forty-five degrees to the level of the ground, so if the foot is pointed to about forty-five degrees it will be about right.

The most effective way of killing lice on goats is dipping. The only drawback to this method is that it can only be used in warm weather, when there will be no liability of the goats taking cold from the bath.

If you have only a few goats they can be stood in a thub and sponged with the dip. For a large number galvanized iron tanks are made for sheep and hog dipping. Concrete makes a good tank and so does a piece of heavy canvas thrown over a wooden frame in such a way that the center can sag. A kitchen table turned upside down and the canvas thrown over the legs and tied securely at the corners after forming a pocket in the center, makes a fairly good small tank.

The chill should be taken from the water if necessary and this will probably be the case if the water is drawn from a well, or a city service.

The dips used are the sheep and cattle dips advertised in the agricultural papers, and which are usually coal tar disinfectants. The directions supplied by the manufacturers should be followed, as the different makes vary a little in strength. Carbonol I have used in the proportion of one gallon of the disinfectant to one hundred gallons (two oil barrels) of water and found the mixture very effective. The coal tar dips are very healing and can be used for cleansing wounds as well as general disinfecting purposes. These dips when mixed with water give the latter a milky appearance.

Care should be taken that all parts of the animal are reached, especially the head, with the mixture. If a tank is used the head can be immersed.

SWISS TOGGENBURG MILK GOATS," by Peer,
Bulletin No. 68, B. A. I., U. S. Dept. of Agriculture.

If the disinfectant is too strong, it will make the eyes smart a little, but seems to do no real harm.

The government specifies dips as follows:—the tobacco dip, containing seven one-hundredths of one per cent nicotine, the lime sulphur dip, made by mixing eight pounds of unslacked lime with twenty-four pounds of sulphur and boiling with thirty gallons of water for not less than two hours and then diluting to one hundred gallons; the coal-tar creosote dip, made by mixing coal tar creosote and cresol with rosin soap.

This latter is the same as most of the market disinfectant dips.

The government suggests testing the coal tar dips with the water available by mixing a small quanity and letting stand for an hour. If there is an oily layer on the surface, the water should not be used, as the oil might cause injury to the stock. This precaution is especially necessary where the water is hard. "Black Leaf 40" is a splendid nicotine dip, it has been used by the writer in dipping goats with the best of results.

REGARDING THE HORNS

THAT the presence or absence of horns has no influence upon the value of the milk goat as a milk producer is vouched for by all goat men. But opinions differ in regard to their usefulness; generally speaking, the horns are a nuisance and of no value to the animal, except as a weapon to be used against dogs, which might be considered an advantage when the goats are allowed a large range in which they would be likely to be bothered by dogs or other animals. As a rule goats can look out for themselves, horns or no horns, except when very young, then care should be exercised by the breeder that vicious dogs be excluded from the goat pasture. Sometimes horns add to the general appearance of the animal, but that will depend upon the likes and dislikes of different people, it being generally conceded that the hornless is most in favor among milk goat breeders, when all things being equal, and no valuable milking characteristics are sacrified.

There is a general tendency among breeders to breed out horns by using hornless sires, but the tendency for horns to grow is still there even though both sire and dam are hornless. Dehorning grown animals is a laborious and cruel task and should never be undertaken by any but a veterinary. Dehorning, or dis-budding kids under 5 days old is practical and is easily done. The older and most common method is the use of costic potash, or costic soda which can be secured at any drug store in sticks a few inches long which are moistened and applied to the horn knob when it can first be felt, a few applications will burn or kill the tissue that forms the horn.

A better method of dehorning kids is to cut a circle around the horn knob with a one inch wad cutter that can be secured at hardware or gun stores, press and twist the wad cutter through the skin and tissue to the skull bone, then lift out the round piece of skin with a pen knife, the tissue that forms the horn will be attached to the skin and when removed no horns will ever develop. Apply an anticeptic, and when healed over there will be a very small scar scarcely noticeable.

The use of a veterinary's trephine will take the place of the wad cutter but is a more expensive tool to buy, but it does the work well.

Often horns are quite an advantag in tying a goat, a rope or piece of wire fastened around the base of the horns take the place of a collar or halter, and a goat can not pull near so hard on her rope when fastened around the horns as it can when fastened by means of a collar or halter, one of which are a necessity when the goat is without horns.

VALUE OF THE MANURE

THE manure produced by the goat has a slightly higher value than that of sheep, and as sheep manure in regions where manures are purchased at commercial prices, is valued at about $3.30 per ton, it can be readily seen that where milk goats are confined to stables, the manure is an item worthy of notice. If the animals are allowed to occupy land that is to be used for the production of vegetables, grain, or grass, the influence of a very few animals is readily felt even over a considerable area of land. There is a permanency in the effect of such manure upon the land that cannot be attained from commercial fertilizers.

Angora goats have been given much well-deserved credit for destroying weeds and brush upon very valuable land and at the same time depositing upon the land a good coating of fertilizer. This clearing and fertilizing has caused fields of valuable grass to spring up where only weeds and brush grew before.

The milk goat breeds will do as much if the opportunity is given them.

There is no better fertilizer for fruit trees and lawns than goat manure and none equal to it for this purpose except sheep manure.

DESTROYING BRUSH WOOD

WHILE the writer does not consider milk goats as well adapted to the destroying of worthless brushwood as the Angoras, it is not because the milk goat has not the ability or the willingness to do so, but is only because of the bad effect on the flavor of the milk such food might have, but all goats not milking, especially the kids and bucks, should have some browse, if it is available.

The act of browsing furnishes exercise for the animals which is a necessity, and a little browse will serve as a tonic and thus help to keep them in good condition. The milk goat dairyman will find that a small piece of brush land would be a valuable place to turn his bucks, kids and does not giving milk.

In clearing land of brush too much should not be expected of the goats. Don't try to make the goats clear the land in too short a time. Some times a number of goats are starved into eating everything on the land, even to barking the trees and saplings in order to get food. This may be all right for the land, but it is hard on the goats.

MILK GOAT MEAT AS FOOD

THERE is some prejudice existing against the use of goats of any kind for meat. This is undoubtedly founded upon ignorance rather than experience. The most ill-smelling "billy" of the common or worst type is usually held as the standard of goats flesh for the whole goat family. Surely there could have been no prejudice existing in Abraham's day when we read of goats being used for meat and milk purposes, and this, too, when there were an abundance of cattle and sheep to be had.

The flesh of the milk goat kids can be classed with the most delicate of meats, being exceedingly nutritious, and palatable and absolutely free from all infectious diseases. The flesh of the famous Shropshire lambs which is considered as among the best of meats is said not to be superior to a well fed and well cooked milk goat kid. It is stated by good authority that milk goat kids, when dressed at eight weeks old, sell readily in our eastern markets for from $3.00 to $5.00 each. The flesh of the older animals compare very well with that of our best meat breeds of sheep and is superior to that of the common goat. The delicacy of their flesh ought to insure a ready market anywhere and the milk goat dairyman can undoubtedly realize a good profit on all male kids not to be used for breeding purposes.

As a usual thing the meat of goats is termed as "mutton" "goat mutton" and "goat venison." When the goats are fattened on grain and fodders the meat resembles sheep mutton, and when they are fattened on twigs and leaves it resembles the meat of the deer and for this reason it is sometimes called venison.

VALUE OF THE SKINS

THE value of the skins from milk goats will undoubtedly be an item of important consideration to the American goat dairyman in years to come, but at the present time there are too small a number of milk goats killed for the purpose of meat or skins, but of course some of the male kids will have to be slaughtered, especially those from "grades" and poorer milking does as such animals would not do for breeding purposes.

The following is quoted from a government publication: "The skins of milk goats are of better quality than those of the Angora breed, and are the kind used in the manufacture of shoes and gloves, and those from the colder parts of the country are better than those from the warmer parts. Inasmuch as the United States imports millions of dollars worth of goatskins annually, it would seem that there should be a ready market for all that might be produced here."

Milk goat skins are used by furriers very extensively in the production of the imitation bear skin. Their market value will vary considerable depending upon the size, age, color, length of hair, and season of the year when taken.

LENGHT OF MILK GOATS LIFE

WHEN a doe has been kept under ordinary good conditions she will be at her prime when from 4 to 7 years old, although good milkers are reported at from 12 to 14 years of age; however, the average length of usefulness will be not to exceed 12 years, and if good care has been given them they may be expected to produce kids until that age.

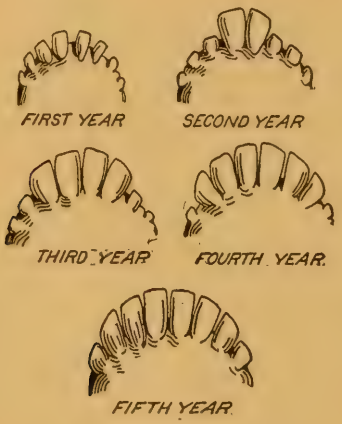
A doe that gives 2 quarts of milk at her first kidding will often give 3 quarts at her third kidding and this amount during her entire life.

The buck should retain his vitality up to 10 or 12 years of age, if good judgment has been exercised in his management.

In determining the age of a milk goat, the accompanying illustration and description of same from B. A. I. bulletin No. 68, U. S. Department of Agriculture, will be very helpful to an understanding of this matter.

"During the first year of a kid's life its teeth are small and even and sometimes separated, as shown in the illustration; the second year shows two front teeth as being much larger and higher; the third year adds two more large teeth; the fourth year, two others, and the fifth year, two others yet, which completes the set. After this time the only way to know a goats age is from records that may have been kept; but one may form some judgment of its age by its general appearance.

There are some breeds of goats that will develop a full mouth in the fourth year instead of the fifth.



BREEDS OF MILK GOATS IN THE UNITED STATES

THE milk goat industry in the United States is barely in its infancy as it can hardly be said that it has more than just started, only a few breeds of Swiss, German, Nubian and Spanish goats have ever been tried to any great extent in our country and as years roll by many new breeds may be tried with good success, the Swiss Toggenburg milk goats have proven exceptionally valuable animals for our country, adapting themselves readily to our climate, and will probably be one of the leading breed of milk goats, just as the Jersey cow leads in milk cows. The Toggenburg might be called the aristocrat of the milk goat family and is from the Togenburg valley in the northeast portion of Switzerland, about 70 to 100 miles from Berne. In this great valley they have been bred for centuries by the Swiss who are a queer people in that they will not allow their best animals to be taken out of this country. This is probably the principal reason why this fine breed of milk goats have never been known better to the English and American people.

The color of the Toggenburg is a light brown with a white bar down each side of the face, this is a mark characteristic with the breed. They are

somewhat slender and one of its principal characteristics is its great leanness. Notwithstanding this fact they are quite attractive in appearance. The does of this breed are about the best milkers we have, being large in size, and having a form well developed for milking purposes. The udder when distended is carried high up and the teats are usually very large and long, making the task of milking them a very easy one.

The Swiss Saanen milk goat is another valuable milk producer. It takes its name from the Saanen Valley of Switzerland, where they are quite numerous. They are also popular in the upper Simmen Valley. The Saanen is probably the largest breed of Swiss milk goats. It is quite tall and resembles very much in anatomy the Toggenburgs. Its color is pure white or creamy white. The hair is rather short except a strip along the spinal column and on the flanks. They are a very graceful appearing animal having long, slim necks and small heads. They are usually hornless as with the Toggenburg which they very closely resemble in many ways. They seem to be well adapted to the more mountainous sections of our country, and when they are more thoroughly tried in our country the writer is firm in the belief that they will be a close rival of the Toggenburg breed.

The Nubian milk goat is the largest breed of milk goats known, it is also the heaviest milker of all breeds of milk goats. They are exceedingly prolific and often give birth to three kids at one time and occassionally four kids at one birth. When pure bred it does not stand our northern winters very well, but when crossed with either the Toggenburgs or Saanen it is one of the very best milk goats for our climates, particularly so when crossed with the Toggenburgs. No member of the goat family is more peaceful or gentle than the Nubian, and while the bucks of this breed have the same odor that all milk goat bucks have the odor is far less in this breed. A peculiarity in this breed is its long pendant ears, they usually have no beard or horns but when there are animals having horns they lay upon the back of the head and curve outward. The color is usually a deep brown and the hair is medium long and quite fine.

The Spanish Maltese milk goats are well adapted to the climate of our country, especially the central and southern part. They are very hardy and prolific, adapting themselves very readily to either extreme or heat or cold and also to most any method of handling. The Spanish Maltese goat is a native of the Island of Malta in the Mediterranean Sea some 54 miles from the Sicilian coast, and comprises but 95 square miles in area. On this Island something like 30,000 milk goats are raised, and from this stock some very fine milkers have been imported to our country, principally through Cuba. Spanish Maltese goats have no distinct color or marking that is characteristic with this breed as is the case with the Swiss goats. They are white, black, brown, red, gray and in fact you may find them of any color. They are some smaller than the Swiss breeds and carry the udder close to the ground, in fact some times the udder of a "fresh" doe will nearly touch the ground, both the udder and the teats are large considering the size of the animals. They usually have horns but a strain that is hornless are bred the same in every respect except the matter of horns.

The American Milk Goat—A few fairly good milk producing goats have been bred in remote localities in this country for a great many years origin-

ating as it seems from various unknown breeds of goats possessing no marked milk producing qualities. It is supposed that some of these goats were brought to the United States by tourists and sailors that brought them more as pets, as a goat is a very intelligent animal and can be taught many interesting tricks. Some of these American milk goats may have been imported with the early importations of Angoras.

In comparison to the superior qualities of the previous mentioned breeds the American milk goat is far inferior in the matter of milk production. Yet by crossing the does with the more superior milk goat bucks we have some of the very best milkers to be found in America in the one-quarter and one-eighth native crosses.

"YOUNG IMPORTED TOGGENBURG GOATS," by Bagby, Bulletin No. 68, B. A. I., U. S. Dept. of Agriculture.

It is known that among these goats there are often found some excellent milkers, although their origin is obscure. These are the kind of goats that should be selected as a foundation for the American breed, and if their milk characteristics were further increased by crossing with either the pure-bred Toggenburg, Saanen or Nubian bucks, which are now in this country, we should soon see a breed that would produce a satisfactory amount of milk and at the same time have all the hardiness possessed by our common goats.

There are but few full-blood goats in this country, the greater share are crosses, but some of the grades are fully as good as the pure breed in their milking capacity.

REQUIREMENTS OF A GOOD MILK GOAT

SO far as the anatomy of a good milk producing goat is concerned, the reader could do well to sum up these points in a dairy cow and when compared to the milk goat will be found very close in comparison. The buck should have a small head, a short thick neck, with abundance of hair. The chest should be broad and massive, the back long and straight and the ribs well-rounded, his family record should be the principal feature as the importance of using only the best buck obtainable is well known.

It is a hard matter to set down a given rule that would apply to all milk goats as to the general anatomy of the animals. As a rule the does of the Swiss and Nubian breeds have a long, lank appearance, slender necks, with small pointed nose, the udder should be capacious and not fleshy with plenty of milk veins leading to it. The udder of a doe not in milk is drawn up so there is very little visible, a large fatty udder is not an indication that the doe is a good milker. The size of the doe has very little to do with her ability to give milk, the writer has seen does weighing 50 to 60 pounds that would give more milk than some does weighing twice that amount. However, it is a good plan to regard large size as preferable to small ones when their breeding qualities are equal, for we must look to the development of the animal at the same time we look to developing the milking qualities.

The following article written by Dr. S. L. Roberts is of interest along this line:

"One of these is a three-quarter Toggenburg, and weighs perhaps eighty-five pounds. She has the Toggenburg shape, marks and expression, also color (mouse) except on abdomen, which is grayish-white. Her record for one month, from February 12 to March 12th, is 295 pounds and 12 ounces; for first seven days, from February 12th to February 19th, inclusive, is 67 pounds and 6 ounces. She increased her milk output from the 20th of February to the 17th of March. There may be many other goats in the country of her weight and age (3 years) that do better than this, but it should be considered a very satisfactory yield, I think. This goat comes from a strain that had its origin away back yonder in the stone age, among the Lake Dwellers in Switzerland, or some such date.

"Another one is a little brown creature two years old, weighing 62 pounds, which is ten-sixteenths Toggenburg and six-sixteenths Mexican Angora. Until about three weeks previous to dropping her kid she gave but poor evidence of becoming much of a producer of milk, as the udder was very small and carried high, and her pelvic region showed but meagre depth. Altogether the little thing promised to do but little in the milk-stand. Four or five days prior to kidding the udder began to show some but wasn't large. For so small a doe her doe kid came very large, and I thought I should have to supply its milk in part from another dam. Suffice to say her udder developed nicely, and when the milk was drawn it shrank to almost no udder at all. She has now (March 20th) been milking twenty days and has yielded

120 pounds and 12 ounces. Back of these does on their sire's side is the best milk ancestry of which I have any record.

"Alongside of them is a doe that weights 128 pounds, which has but one-sixteenth Toggenburg blood, a trace of Alpine, some Mexican, and what not for the rest. She yields 36 ounces a day. Do how I will, I can't get her other than in a condition of grease—she is as fat as a Berkshire porker. Size here doesn't 'milk' out."

Dr. Roberts' 62-pound doe with the right kind of breeding gave over 3 quarts of milk a day while the 128-pound doe with poor breeding gave only about one quart a day.

"AFTON PEDRO" when 4 months old, a ¾ Swiss Saanen and ¼ Swiss Toggenburg buck, used some in breeding the writer's does in 1911. The grand sires and grand dams of this buck were imported from Switzerland.

As there are only a very few pure-bred Swiss goats in this country and as the Nubian do not thrive here unless cross-bred it is easy to see why it is next to impossible to buy pure-bred stock of these breeds, and where they are offered for sale the price is away beyond their real value as milk producers to the person who wants a goat for milk alone. Breeders will pay fancy prices for them to get new blood, but owing to the fact that there has been no Swiss goats imported to this country for many years, (and probably won't be for many years to come) the few pure-bred Swiss goats that are here have become in-bred to such an extent that a good many of them

have lost their best qualities, yet where they have been judiciously bred either pure or cross-bred with the best type of milk goats (regardless of the breed) the best milking stock is usually to be found.

In 1903 there was a record Association formed for the purpose of encouraging the establishment of the milk goat industry in this country. Considering the number of years this association has been established there have been very few goats registered considering the fact that for a long time any kind of a doe could be registered if she gave one quart of milk a day regardless of her breeding, a buck from such a doe could also be registered if the sire and dam were registered. These rules allowed a lot of low grade goats to be registered and did very little toward building up the milk goat industry. Later the rules were changed to admit only does giving two quarts per day regardless of their breeding, and instead of registering bucks from registered sires and dams of any beeding only bucks from pure-bred, registered sires and dams were eligible to registry. There were some good features in this but there were also some extremely unjust features and a sad mistake in eliminating all bucks that were cross-bred with the very best recognized breeds of milk goats. To bar the grade bucks from registry would seem reasonable, that is a buck being part native stock, but it is all wrong to bar the bucks from Swiss and Nubian breeds that are cross-bred, for, with some of them it is only possible to produce the best types for our country by the judicious cross-breeding of these recognized breeds of milk goats, and as the pure-bred stock is so few in this country and so much inbred that it is folly to stick to that old "Royal Blood" idea, for it is a proven fact that some of America's best milk goat stock is the result of cross-breeding in the hands of experienced animal breeders, just as it has been in the breeding of other kinds of live stock, such as horses, cattle, etc. Improvement and not deterioration is what we want and must have.

PURCHASING MILK GOATS

"WHERE can I buy a milk goat?" is often asked by many people, yet if more people knew the true merits of the milk goat, there would be many more such questions asked.

In the breeding of all classes of livestock there are certain prime characteristics in view in the breeding of each animal, certain predominating qualities are in certain individuals, and to bring out these qualties in the offsprings requires the sacrifice sometimes of the pure-breeding. The milk goat is bred for milk alone and the prime characteristic in the animal is the production of milk. The value of the animal will depend almost altogether on these qualities and the price will naturally be in comparison to the milking qualities, rather than in the breed alone. It has developed that some of the best milk stock we have are the result of judicious crossing of breeds.

It would be impossible to quote a fixed valuation on a milk goat in this country at the present time, as that will depend to a large degree on how bad the owner wants to sell or how much the purchaser wishes to pay, and last but not least, how good a milker the goat is.

If the purchaser is buying a goat for milk alone, it is then better to buy a cross-bred doe from some reliable breeder. If you want to go into the

business of raising milk goats and have plenty of money to spend, then try and buy a pure-bred goat, but the man that buys a good cross-bred goat may get the best milker, and he may buy three of them for the same money that you spend for one pure-bred goat.

By far the most satisfactory young stock to buy is that raised on new pasture by a professional breeder. It is healthier, vigorous, hardy and will keep in good condition and continue to grow on hay and farm foods. One important reason is that usually breeder's kids have run with their dams and have had plenty of milk. The process of weaning was gradual and at no time did they receive a set-back or lose their kid-fat. Their sire is usually a selected individual of good milking strain. What is called "back-yard"

"Black Oak," one of the Writer's Finest Breeding Bucks. His Blood is one-half Swiss Toggenburg and one-half Nubian, weight 175 lbs. He is one of the best to be found in this country.

goats, or goats having been raised in back yards are as a rule not the best kind to buy, and I attribute the reasons to be as follows: Breeding too young, and interbreeding so that the kids lack constitution. Breeding to any buck available, regardless of whether of milking strain or not. Weaning too young. Unclean surroundings and unclean food which favor the development of internal parasites.

A doe giving milk should never be shipped. She may become nervous and probably frightened while on the voyage which will have a bad effect on her milk flow. Then if a stranger undertakes to milk her she will object

to this, and it is almost impossible to have a doe milked while in the care of the Express Companies, and would probably reach her destination with a caked udder which would almost ruin her as a good milker. Then if she did reach her destination in good order, the people, the surroundings, everything is new to her, and a nervous doe will begin to fret, she gets lonesome, she is homesick, and she could not be expected to give a good flow of milk under such conditions. It is far better to purchase a doe that has recently been bred and that has been "dryed off." The doe, or does, will then become acquainted with their new surroundings, the people, etc., and then when the kids come the does are perfectly contented and are capable of then doing their best at producing milk. Then the owner also has the kids. A doe being pregnant over three months should never be shipped. A short journey after that time is apt to cause abortion.

Milk goat stock in Switzerland of the average type sells for from $20 to $30 each, and if we could import them it would cost about $25 each to land them on our shore, with a big risk of loss on such a long voyage, but such a thing is impossible, and has been for many years. The following is from United States B. A. I. Order No. 180:

"Owing to the prevalence of foot-and-mouth disease in Switzerland, the Department is not permitting the importation of goats or other ruminants or swine from that country. In fact permits have not been issued for the importation of such animals from Switzerland for several years. This is due to the constant presence of foot-and-mouth disease."

At intervals the Bureau receives official reports from various foreign countries concerning freedom or presence of diseases of livestock. Reports of this character are received regularly from Switzerland and the latest on file, covering the period from November 23 to December 21, indicates that the infection was present during that time in sixteen of the twenty-two Swiss cantons."

The prices of pure-bred Swiss and Nubian goats in this country will range all the way from $50 to $200 each, while cross-bred goats and "grades" will bring from $20 to $100, depending on their milking ability, which in some cases equal that of the pure-bred stock and usually have a far more vigorous constitution, providing they came from a breeder that understands his business. When it comes to the estimating of the value of goats for milk alone the following is, in the judgment of the writer, a fair scale of prices:

A doe that gives from 1 to 2 quarts a day is worth from.....$15 to $ 25
A doe that gives from 2 to 3 quarts a day is worth from..... 25 to 50
A doe that gives from 3 to 4 quarts a day is worth from..... 50 to 90
A doe that gives from 4 to 5 quarts a day is worth from..... 90 to 150

And one giving over 5 quarts a day would sell for still a larger sum of money which varies considerably, and also depends a great deal on other requirements of the animal.

The writer has known a great many instances where parties having goats to sell will misrepresent the milking qualities of their goats. Purchasers should be very cautious about buying milk goat stock. Buy from reliable parties if possible, and don't believe too much about what is said

by some people regarding their "5" and "6" quart does. Such stock in this country is very scarce and such does sell readily when their milking ability is proven.

Sometimes a goat giving a quart may be picked up cheap, and if it is a first kid she may make a good milker later, as a two-quart milker will supply an average family with milk.

The best way for one to get a start unless they have plenty of money, is to buy the kids and raise them. Of course, however, where one only wishes the milk and does not care for fancy marks or color, a grade goat is just as good.

One of the Writer's Grade Toggenburg Does.

SHIPPING GOATS

IN shipping goats it is nearly always customary to crate them and ship by express, it is customary for the purchaser to pay the express charges unless the owner quotes a price to the customer in which the owner agrees to prepay the express charges which is very seldom done. Shipping goats C. O. D. is a very bad practice, for if the purchaser changes his mind and decides not to take the goats upon their arrival at their destination the owner then has to pay the express charges both ways with an accumulated feed bill while the express company is awaiting instructions for their return.

In constructing a crate for shipping it is very important that the crate be made as light as possible and at the same time strong, a solid bottom of ¾-inch light boards is necessary, and a frame of 1x2 inch material next,

wire netting can then be drawn around the sides, ends, and top, then put 3 or 4 strands of smooth wire around the entire crate and twist tight. This makes the crate "goat tight" or, if there is no woven wire at hand, make a frame as above, and nail thin box boards perpendicular, leaving 3 or 4 inches between boards, then draw 2 to 3 double strands of wire around the crate and twist the wires between each board. This makes the crate rigid, yet it is light. The size of the crate should be in accordance with the number of goats to be shipped, the size of the goats, and the distance they are to travel. Enough space should be allowed so that the goats can lie down or stand up straight. As a rule the crate would weigh about one-half of the body weight of the goat to be shipped; if a goat weighs 60 pounds the crate would weigh 30 pounds, and the shipment including goat and crate would weigh 90 pounds. Where a number of goats are shipped in one crate the weight of the crate should be still less in proportion to the body weight of the goats which makes the cost of shipping far less for the purchaser, and it is a good plan for those wishing to buy one or two goats to get their neighbors and friends interested and have a number come in the same crate, then the express charges can be divided among the different parties. Then, as a rule, a breeder will make a better price on a number than on one as it costs him nearly as much to build a crate for one and deliver to the express office as it does for 3 or 4. Then, when there are several parties in a community that have milk goats for their own family use, they can chip in together and each buy an interest in a breeding buck, and can take turn about in keeping the buck, in this way each one has the use of a breeding buck and it don't cost anyone very much money.

Express companies look after the feeding while in their charge. Instructions should be placed on the crate as to what and when to feed. For short rides this is not necessary. The shipper should notify the purchaser a few days prior to the day shipment is to be made so that the purchaser will know about when to expect the shipment.

The public regards the goat as a joke. While he is at the depot awaiting shipment a crowd of people are offering him every conceivable thing to eat. A doe will not bite, perhaps, but a sociable buck will even take some of their tobacco or chewing gum, though he feels he does not need it. He probably has bad habits enough of his own without taking on any of man's.

TERMINOLOGY OF THE GOAT INDUSTRY FROM THE AMERICAN STANDARD MILK GOAT KEEPER

Buck, the perfect male.

Doe, the perfect female.

Kid, the young, either male or female.

Weather, a male which was castrated when a kid, or a spayed female.

Stag, a male which was castrated after attaining full growth.

Weanling, a kid just weaned.

Yearling, either a doe or buck between a year and two years old.

Farrow Doe, not with kid.

Springer, a doe soon to kid.

Barren, infertile, incapable of reproduction.

Sire, a male parent.

Grandsire, the grandfather.

Dam, a female parent.

Granddam, the grandmother.

Heredity, characteristics acquired from ancestors.

Ancestry, all goats from which an individual has descended.

Pure Bred, when both parents are either registered as pure bred or are descended from registered pure bred stock or from imported goats which the A. M. G. record would register as pure bred.

Thoroughbred, the same as pure bred, but not as good a term.

Grade, a goat with a pure bred parent.

Grading, breeding to pure bred bucks.

Breed, a strain or variety of recognized kind and type, a sub-division of species.

Breeder, the owner of the dam at the time of service.

Breeding, the mating of goats intelligently to preserve or augment valuable characteristics.

Species, a sub-division of genus, and includes animals differing to a greater extent than breeds. Species will interbreed indefinitely. The scientific name of milk goat is Capra hircus. Capri indicates the genus and hircus the species.

Selection, the use of breeding animals which possess the characteristics it is desired to perpetuate.

Natural Selection, the mating of such goats as have had sufficient strength to survive the conditions which have killed the weaker animals.

Half-Blood, a goat with one pure bred parent. 50 per cent improvement.

Three-quarter Blood, a goat with a pure bred grand parent and also a pure bred sire. 75 per cent improvement.

Seven-eighths Blood, a goat with a pure bred great grand parent and a pure bred grand sire and a pure bred sire. 87.50 per cent improvement.

Fifteen-sixteenth Blood, 93.75 per cent improvement.

Thirty-one Thirty-seconds Blood, 96.875 per cent improvement.

Cross Bred, having pure bred parents of two different breeds.

Hybred, having parents of different species.

Sport, a goat with a striking peculiarity not possessed by its ancestors.

In-Bred, having parents that are related.

Line-Bred, the repeated use of sires from one family to fix and preserve a family characteristic.

Scrub, no particular breed.

Degenerate, an inferior animal which has not inherited or developed desirable characteristics.

Character, any prominent peculiarity of a family or individual.

Dominant Charcter, a characteristic of a family or individual so strongly fixed that it appears in three-quarters of the offspring.

Latent Character, not noticeable in one generation, but which may appear in the next.

Recessive Character, the weakest of two parental characteristics which is sufficiently strong to mark or appear in one-fourth of the offspring.

Acquired Character, peculiarities due to environment or care.

Reversion, the reappearance of a characteristic of a remote ancestor.

Throwing Back, the same as reversion.

Prepotent, the ability to transmit the individuals or family qualities to the offspring.

Mendal's Law, the law indicating the extent to which kids will resemble their parents.

Variation, the differences shown by two animals of the same breeding.

Progression, a higher average quality as compared to the ancestors.

Regression, a tendency to approach the average either by losing character or by progression.

Pedigree, the record of a goat's ancestors.

Registered, having been placed on record by the American Milk Goat Record Association or International Nubian Breeders' Association and provided with a registration certificate and ear tag.

Unregistered, pure bred but not registered, as in case of loss or records or uncertainty of identity of parents.

Registered Toggenburg or Saanen, indicates that the goat is pure Toggenburg or Saanen. Not the same with other breeds where the word registered is used in connection with the breed name.

Registered American, indicates that a goat has given two quarts or over of milk a day but does not guarantee in any way the breeding of the animal.

Certificate of Registry, the document issued by the American Milk Goat Record Association or International Nubian Breeders' Association, indicating that the goat has been registered in their books.

Transfer, in case a registered goat is sold, the transfer of ownership is recorded and a transfer paper issued by the A. M. G. R. A., or I. N. B. A.

Ear Tag, a metal band, issued by the A. M. G. R. A. and bearing the registration number, for affixing to goat's ear.

Stud, a breeder's collection of breeding animals.

Imported, animals bred outside of the United States, Canada or Mexico.

Horned, having horns.

Dehorned, born with horns but having had them removed.

Hornless, born without horns.

Belled, having throat appendage or wattles.

Thremmatology, the name of the scientific dealing with the improvement of domestic animals.

Unsound, a goat having any disease, injury, defect or member missing which incapacitates the animal in any way.

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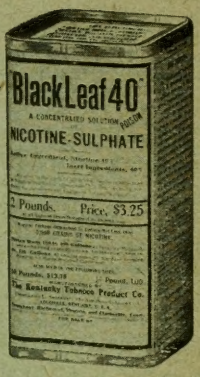

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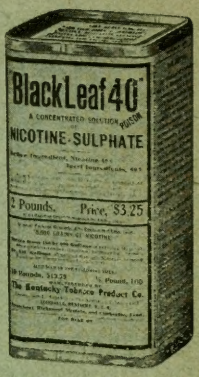

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